Review of Mineral Production in India 1894 & 1895

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REVIEW

OF

MINERAL PRODUCTION IN INDIA.

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GEORGE WATT, M.B., C.M., C.I.E.,

REPORTER ON ECONOMIC PRODUCTS TO THE GOVERNMENT OF INDIA.

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The instructions issued by the Government of India, on the subject of the compilation of returns on Mineral Production, are briefly that the particulars annually ascertained should be given in the form of two statements, *viz.*, Statement No. I., *The More Important Minerals*—those for which approximately trustworthy returns are available from year to year; and Statement No. II., *Commercial Minerals, regarding which definite and constantly recurring particulars cannot be procured.* It is believed that an attempt to bring together annual returns under each of these sections would very possibly eliminate the defects that exist in our knowledge of the mineral wealth of the country and thereby forcibly direct attention to this aspect of India's productive resources. It is, however, feared that some years may have to pass before the **Review of Mineral Production** can be regarded as anything more than a convenient tabulation of such particulars as are annually procurable. This remark refers in a very special degree to the returns in Statement I. of Iron Ore and to a very large percentage of the quotations given in Statement II. The figures recorded of the transactions in Salt, Coal and Petroleum may, however, be advanced as fairly accurate and complete.

It will be seen that the tabular form of Statement I., appended to this Review (*pp. 34—37*), gives columns to show the returns of the calendar year 1894; the year immediately preceding; the average of the three years 1891, 1892 and 1893; as also columns to denote the percentages of increase (+) or decrease (—) on 1893 and on the average column. In some cases it is probably a more trustworthy standard to compare the returns of one year with an average of three or five preceding years, than with the actual year immediately preceding. This has been attempted throughout the Review. It will also be observed that an effort has been made to return the produce of British Provinces apart from that of Native States, though it is feared some of the smaller Native States may have been recorded in connection with the Provinces in which they are located.

Statement I.

(*For Statement II. see page 14.*)

THE MORE IMPORTANT MINERALS.

I. SALT (*Namak, Hind.*)

2. Production.—The production of Salt in India will be seen to have manifested a very considerable expansion during the year 1894. In Statement No. I. (p. 34) it is shown that, whereas the returns of production for 1893 gave a total output of 837,664 tons, those of 1894 rose to 1,297,378 tons. That is to say, there has been manifested an expansion of production which amounts to 41·38 per cent. on the average of the three preceding years. ***SALT.*** ***Conf. with page 34.***

3. Sources of Supply.—Locally-produced salt may be said to be obtained as follows:—

(1) The ROCK SALT of the Panjab, of three kinds—the *Lahori*, *Kohati*, and *Mandi*;
(2) The LAKE-SALT of Rajputana known as *Sambhari*;
(3) The PIT-BRINE SALT of Sultanpur (Delhi) in the Panjab, known as the *Sultanpuri*; Didwana (the *Dindu* Salt), Pachbadra (the *Kausia* Salt), and Falodi (the *Falodi* Salt) in Rajputana;
(4) The SALTPETRE SALT (known as *Pachwa* and *Nimak shor*) of Behar and the North-West Provinces; and
(5) The Salt obtained by evaporation of SEA WATER. Of this nature may be mentioned the *Kokani*, of Bombay, *Kirkutch* and *Banwar* of Madras, the *Panga* of Orissa and many other less known forms, such as the *Barazara* of Guzerat and the *Arakan* and *Tenasserim* of Burma.

More briefly it may be said that there are four chief sources of supply, or rather four classes of salt:—(*a*) Rock salt of the Panjab; (*b*) Evaporation salt from the lakes and pits of Rajputana; (*c*) Evaporation salt obtained directly or indirectly from the sea; and (*d*) Foreign salt imported into India.

4. Outturn at Various Centres.—The PANJAB salt production may be said to have practically remained stationary, so far as the total outturn is concerned. The average of 1891—93 was 106,615, the returns of 1893 104,522, while 1894 stood at 104,939 tons. But considerable changes may be said to have taken place. The supplies drawn in 1894 from Kohat, Mandi, and Sultanpur collectively declined by close on 3,604 tons, but these losses were more than made up by the increased production of the Government salt mines which show an expansion of 6 per cent. on the output of 1893.

5. The RAJPUTANA production displayed during the year remarkable activity. The outturn of 1893 was only 83,125 tons, but in 1894 it rose suddenly to 339,350 tons. The increase was, therefore,

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308 per cent. over the previous year and 305 per cent over the average of the three previous years. This almost unprecedented expansion took place mainly at Sambhar in Rajputana, where the production was 70,991 tons in 1893 and 277,973 tons in 1894. But the salt marshes of the Jodhpur State also displayed considerable activity. The production of Didwana stood at 1,474 tons in 1893 and rose to 13,457 tons in 1894; Pachbadra stood at 10,045 tons in 1893 and reached 47,884 tons in 1894, while the supplies drawn from Falodi declined. The pit-brine salt of Sultanpur, though formerly considered a favourite, in the North-West Provinces and Oudh, is now being steadily ousted by the Sambhar salt. Twenty-five years ago the annual production of Sultanpur was about 25,000, in 1890 it had fallen to 11,000, and last year was only 3,000 tons.

6. AROUND THE COAST.—The production of salt from sea water has also during the year under review manifested a striking improvement and that too practically all round the coast of India, in spite of the large quantities of foreign salt that are yearly landed at the port towns. For this purpose alluvial muddy flats are selected that are annually subject to inundation at high tides. Reservoirs formed by mud walls are made to retain the sea water and check its return. It is then drained further inland to shallow crystallization-pans, separated by ridges. In these the water is allowed to evaporate naturally, which it does at the rate of about eight inches a month. Indian sea salt contains from 80 to 95 per cent. of chloride of sodium.

But on some parts of the coast there exist naturally formed swamp-salt-works. Swamp salt occurs in extensive cakes about an inch thick, upon the surface of littoral wastes. Crystals of swamp salt are remarkable for their solidity and purity.

Artificial evaporation of sea water is scarcely practised anywhere and is in fact prohibited.

7. In BENGAL where the manufacture of marine salt is confined to a small tract of country, in the south of Orissa, the increase has been from 1,591 tons in 1893 (and the average of the three previous years, *viz.*, 2,193 tons) to 8,759 tons in 1894.

8. In MADRAS it would appear the increase in the production of marine salt has been 21 per cent., *viz.*, from 269,138 tons in 1893 to 326,501 tons in 1894.

9. In the BOMBAY PRESIDENCY an even still greater expansion has taken place in the salt of this nature which amounted to 37·89 per cent., *viz.*, from 317,803 tons in 1893 to 438,229 tons in 1894. Of the latter figure Sind contributed 8,201 tons. The production in the Native States of Bombay has never been very extensive; but during the past year it manifested a very slight expansion, *viz.*, from 4,130 to 4,180 tons. In passing it may here be remarked that in Bombay and Sind (as with some of the other provinces concerned in the production of salt directly from sea water) the entire outturn is not of that nature though the other sources of supply are so unimportant that they may be disregarded.

10. The BURMESE production of salt continues to expand: the outturn stood at 13,284 tons in 1893 and last year it came to 17,516 tons, or an expansion of 31·85 per cent.

11. Since ADEN is under the administration of the Government of Bombay, it may be here treated as part of India. The supply of salt drawn by India from Aden continues a significant feature of recent returns. It would seem that the syndicate of monopolists in Cheshire, who persisted, some few years ago, in raising the price of English salt, brought forward Germany and Aden as competitors, besides having fostered an increased production of salt from sea water within India itself. The following were the imports of salt from Aden, during the under-mentioned official years:—

	Tons.		Tons.
1888-89	17,397	1891-92	33,969
1889-90	33,782	1892-93	37,282
1890-91	36,662	1893-94	51,051

Doubtless, as pointed out by **Mr. J. E. O'Conor, C.I.E.** (*Review of the Trade of India for 1893-94*), the working of the Italian Salt Company at Aden, where salt is produced cheaply, and the low rates of freights from Aden to Calcutta, have each contributed to the establishment of this new trade.

12. **Government and Private Enterprise.**—Since it is in the first instance at all events with the direct production of salt from sea water or from recent marine deposits near the coast of India that foreign salt has to compete, it may be instructive to give here a table showing the returns of this salt, grouped into two sets of columns, namely, the separate shares taken by Government, and by private enterprise:—

Analysis of the Published Returns of Marine Salt.

	1894.		1893.		1894.	1893.
	Manufactured by Government.	Manufactured otherwise than by Government.	Manufactured by Government.	Manufactured otherwise than by Government.	TOTAL.	TOTAL.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Madras	60,643	265,858	40,301	228,837	326,501	269,138
Bombay and Sind	108,045	330,184	91,804	225,999	438,229	317,803
Bengal	7,708	...	564	...	7,708	564
TOTAL .	176,396	596,042	132,669	454,836	772,438	587,505

It will thus be seen that the production of marine salt, otherwise than by Government, is usually about four times that of the Government manufacture. But the returns of last year show an expansion on 1893 of 32·96 per cent. for the Government production of salt from brine and of 31·04 for that turned out by private enterprise.

2. The salt obtained, in some portions of Bengal and the North-West Provinces, as a by-product in the Saltpetre refineries has been left out of consideration in the above table. (*See pages 4,26.*)

13. Foreign Imports.—In this connection it may be desirable to give here a brief statement of the traffic in Foreign Salt, imported into India during the past five official years:—

Salt Imported into India from Foreign Countries.

	Tons.	Cost per 100 maunds.	Percentage increase or decrease in value on preceding year.
1889-90	410,808	89·8 to 98·2	+ 3·0
1890-91	395,243	71·2 to 81·2	—12·9
1891-92	373,953	57·5 to 69	—19·4
1892-93	360,042	58·5 to 65·1	— 8·1
1893-94	412,876	72·9 to 80·8	+37·2

14. In order to exemplify the countries from which these foreign supplies were drawn the following table may be given:—

Countries from which India Imports Salt.

	1889-90.	1890-91.	1891-92.	1892-93.	1893-94.
United Kingdom	285,767	273,008	222,260	241,061	268,715
Germany	45,439	60,540	103,403	47,391	47,811
Arabia	35,736	11,322	9,840	25,887	21,475
Aden	33,782	36,662	33,969	37,282	51,051
Other Countries	10,084	13,711	4,481	8,421	23,824
TOTAL IN TONS	410,808	395,243	373,953	360,042	412,876

The expansion of the German and Aden supplies of salt, and what may be characterised as a decline in the British, is thus fully borne out by the returns shown in the above tables. It may further be noted that a contraction in the demand for British salt took place in the face of material reductions in price. But a satisfactory feature regarding imported salt as a whole, so far as India is concerned, may be said to exist in the fact that the imports do not keep pace with the increasing consumption of the commodity. This doubtless is largely due to improvements in outturn and facilities of transport combining to lower the price of Indian salt and thus to bring it to the door of the consumer at a price that has created a greater demand than was possible in former years.

15. Imports in Relation to Consumption.—The relation of imported salt to the local manufactures, especially along the coast of India, may be shown by the following table:—

Consumption in Relation to Imports in 1894.

Province.	Total consumption (calendar year).	Quantity imported (official year).	Percentage of imported salt to total consumption.
	Tons.	Tons.	
Bengal	367,011	365,174	99·49
Madras	293,399	65	0·022
Bombay, including Sind	251,852	145	0·05
Northern India	264,481	*Nil*	...
Burma	54,065	47,492	87·84
TOTAL	1,230,808	412,876	33·54

Thus the total imports of the year 1893-94 showed to the consumption a percentage of 33·54, but in Bengal and Burma the imports were very nearly consumed locally, that is to say, the imports into Bengal came to 99·49 per cent. of the consumption and those of Burma to 87·84 per cent. Bombay and Madras are supplied by locally manufactured salt. But from the table given above, of the brine salt manufactures of the coast, it will be seen that Bombay to a very large extent, and Madras to a smaller degree, produce very much more salt than they consume. The surplus produce of Bombay is exported by rail or by coast to meet the demands of non-producing provinces. In fact in passing it may be said that Bombay is the chief source of supply for the Central Provinces and for the Deccan down to Mysore. It may also be remarked that the consumption in Native States is not known to the same extent as in the case of British provinces, though the production at the more important centres within these States is under direct supervision, if not actually worked by Government. In some parts of the Native States, and to a certain extent in the less civilized portions of the British provinces also, there is a limited manufacture and consumption of salt from brine pits, of which cognisance is not taken. It is satisfactory that the earth salt manufactured as a by-product of saltpetre refineries is year by year becoming of less importance since, like many of the other salts prepared from ancient brine impregnations of the soil, salt of this nature is hardly fit for human consumption. The salt manufactured more or less directly from sea water on the other hand appears to be gaining in popular favour and is of remarkably good quality.

16. **Internal Salt Traffic.**—It may now be desirable to exemplify the movements of salt of all kinds within India by Rail, Road and River or Coastwise by Sea, in order to arrive at some conception of the nature of the salt consumed in the various provinces. Importing provinces may be regarded as non-producing or as not producing sufficient to meet local demands, and the provinces from which they draw their supplies are either producing provinces or centres of distribution in foreign and Indian salt. It may be as well to again mention the circumstance hinted at above in one or two places that the statistics of trade are for the official not the calendar years, so that hard-and-fast comparisons between the rail-borne traffic, for example, and the returns of production for one year would be inaccurate, though the error involved disappears or practically so when a number of years are taken into consideration.

17. **Imports of Indian Salt by Port Towns.**—A somewhat significant fact will be seen to be brought out by the table of movements of salt within India, given below (Appendix, pp. 40—41), namely, that the great seaport towns— Madras, Bombay, Karachi and Calcutta—practically import no salt by the railways of India. During the past five years the rail-borne imports to these towns collectively has not exceeded on an average 100 tons.

18. **Chief Importing Provinces.**—During the past five years the importing provinces (mentioned in the order of importance and the sources of supply also mentioned in the order of importance) have been (1) BENGAL (drawing its supplies from Calcutta with a very small quantity from the Panjab); (2) the NORTH-WEST PROVINCES AND OUDH (drawing their supplies from Rajputana, Panjab, Calcutta and Bombay); (3) MADRAS (drawing its supplies almost exclusively from Madras sea ports and small quantities from Bombay); (4) the CENTRAL PROVINCES (drawing their supplies mainly from Bombay and smaller quantities from Rajputana and Bengal); (5) NAIZAM'S DOMINIONS (drawing their supplies from Bombay and Madras); (6) ASSAM (drawing its supplies from Calcutta and Bengal province); (7) BERAR (drawing its supplies from Bombay); (8) CENTRAL INDIA AND RAJPUTANA (drawing their supplies, over and above local production, from Bombay); (9) MYSORE (drawing its supplies from Madras sea ports and Bombay port and Presidency); (10) PANJAB (drawing its supplies, over local production, from Rajputana); (11) SIND (drawing its supplies from local production, from Karachi, and from the Panjab); and (12) BOMBAY (drawing its supplies, over local production, from Bombay port town).

19. **Port Towns Treated as Provinces.**—To a certain extent the above sketch of the average internal transactions in salt has its value obscured through the port towns being treated as distinct centres apart from the provinces in which they are located. Madras, for example, appears high up in the enumeration of importing provinces, because the salt is manufactured along the coast and is distributed to the province from its port towns. Bombay again appears very low down in the scale of importing provinces, because its locally produced salt does not pass through its port town as the distributing centre.

20. **Centres of Production.**—The centres of production are therefore exemplified more directly by an enumeration in the order of magnitude of the exports.

(1) CALCUTTA is the chief importing town for foreign salt; it becomes accordingly the exporting centre from which the provinces of Bengal and Assam draw their supplies. The North-West Provinces also take a fairly large amount of foreign salt from Calcutta and a very small quantity goes annually to the Central Provinces.

(2) RAJPUTANA stands after Calcutta the next most important exporting centre: it supplies fully three-fourths of the demand from the North-West Provinces and Oudh.

(3) BOMBAY takes the third place in the order of supply, its exports go mainly to the Central Provinces, the Naizam's Dominions, Berar, Central India, the North-West Provinces and Mysore. It is somewhat significant that in the returns of rail, road and river, neither the port-town nor the province of Bombay is shown as importing more than mere nominal quantities of salt, so that over and above the supplies sent to external blocks the province is self-supporting.

(4) The MADRAS seaports stand fourth in the list of exporting centres, but they practically only distribute the coast manufactures to the interior of the province and to Mysore.

(5) The PANJAB, though it may be said to possess mountains of rock salt, exports comparatively speaking but a small amount. In addition to meeting its local demands it supplies the North-West Provinces with little more than one-tenth of the quantity which these provinces draw from Rajputana.

21. **Rail-borne Traffic in Salt.**—The table given in the Appendix (pp. 40—41) will be seen to exemplify the internal transactions in salt carried by Rail, Road and River during 1894. The columns display vertically the imports of each province; while the figures read transversely, against the name of each province, manifest its exports. It will further be observed that the chief port towns are treated as provinces by themselves, in order to bring out the part they play in the foreign supply.

22. Coastwise Trade in Indian Salt.—By way of concluding this brief review of the production and consumption of salt in the various provinces of India it is only necessary to show the share in the traffic of distribution accomplished coastwise:—

Imports in Tons of Indian Salt.

	Into Bengal.	Into Bombay.	Into Sind.	Into Madras.	Into Burma.	Total.
1889-90	14,338	42,211	233	45,786	2,664	105,232
1890-91	23,043	40,434	208	48,204	1,502	113,391
1891-92	24,195	39,389	223	51,661	1,833	117,301
1892-93	23,707	42,312	205	45,996	1,702	113,922
1893-94	21,149	43,791	205	39,704	1,626	106,475

Exports in Tons of Indian Salt.

	From Bengal.	From Bombay.	From Sind.	From Madras.	From Burma.	Total.
1889-90	...	115,898	271	5,094	3,205	124,468
1890-91	...	124,166	223	3,341	2,159	129,889
1891-92	...	144,622	227	2,868	1,106	148,823
1892-93	...	141,294	208	4,160	2,143	147,805
1893-94	...	134,122	211	2,742	1,813	138,888

It will be seen that Bombay is by far the most important exporting province and that it furnishes, as a rule, about three times as much as it imports. Of the 138,888 tons exported last year, 134,122 tons went from Bombay, and of that amount 37,969 tons were taken by Madras, 18,851 tons by Bengal, 18,518 tons by Travancore, 10,672 tons by Goa, and 42,994 tons from the chief port town of Bombay to other ports within the Bombay Presidency.

Of the total coastwise imports last year (106,475 tons) Bengal drew its portion as stated above from Bombay; the port town of Bombay obtained from the presidency of Bombay, coastwise, 43,791 tons; and Madras obtained the quantity mentioned above from Bombay. Briefly, therefore, the coastwise transactions in salt are imports by Bombay town from the other port towns, within the Bombay Presidency, and exports from Bombay port to Bengal and Madras. The coastwise transactions in Indian salt, therefore, very greatly augment the importance of Bombay as a producing centre, or rather they serve to bring the figure recorded under the rail-borne transactions up to a closer approximation to the ascertained surplus of production over local consumption.

23. Coastwise Trade in Foreign Salt.—The coastwise transactions in foreign salt are unimportant, amounting, as a rule, to about 12,000 tons exchanged between Calcutta and other Bengal ports.

24. The Transfrontier Trade in Salt is not very important. Under 2,000 tons are imported annually, the bulk coming from Tibet. The exports during the past three years have averaged 23,569 tons, of which the major portion goes to Kashmir and Nepal.

References.—*Records, Geological Survey, Vol. XXII, Pt. 4 (1889), pp. 214—216; Vol. XXIV, Pt. 1 (1891), pp. 19—42; Pt. 2, pp. 129—31; Pt. 4, pp. 230—244.*

II. COAL (*Koyelah, Hind.*)

25. Regions of Production.—The production of coal in India continues to make steady progress. The total quantity turned out during 1894 was 2,774,093 tons, being an increase over the previous year's production of 9·65 per cent., and over that of the average of the past three years (1891—1893) of 12·52 per cent. In other words, the total output for the year came to very nearly five times the quantity imported from foreign countries. The statement of coal production that will be found below (p. 35) displays in a striking manner the somewhat instructive fact that, with the exception of Bombay and Sind, the North-West Provinces and Oudh, Rajputana, Mysore, and Kashmir, all the other provinces and the chief Native States possess coal. Some of the Indian deposits have only very recently been tapped and large areas rich in the mineral remain untouched, so that the prosperity indicated by last year's returns may be said to give but a foretest of future possibilities.

Conf. with page 35.

26. Bengal.—During the year under report, 1,989,375 tons of coal were produced in Bengal as against 1,870,720 tons in 1893—an increase of 6·34 per cent.

27. Central Provinces.—The supply of coal from the mines in these provinces continues to manifest a steady expansion. The output of 1894 came to 140,495 tons or an increase of 3·98 per cent. on that of 1893, or of 3·08 on the average of the three previous years.

28. Assam.—Assam produced 169,448 tons in 1894, being 3·05 per cent. over the quantity obtained in 1893. The mines are situated at Makum in Lakhimpur District and in the Trans-Dekho Naga Hills of Sibsagar. Both sources of supply are capable of very considerable expansion, when a

COAL.

local demand is created and greater facilities are afforded for transmission. A recent report on the Assam coals, furnished by the authorities of the Imperial Institute, characterises these coals as being of a high order and as having a particularly low percentage of ash. (See *The Agricultural Ledger*, No. 2 of 1895.)

29. NATIVE STATES.—The coal industry has also steadily increased in the Naizam's Dominions, in the Central India Agency, and in Baluchistan. The total quantity produced in these States during 1894 was 394,860 tons against the previous year's outturn of 271,863 tons, being an expansion of 45·24 per cent., and of 58·33 per cent. as compared with the average production of the last three years (1891—1893). The production of coal in Central India and in the Naizam's Dominions thus gave indications of much more vigorous efforts than were displayed in the mines within British Provinces. Last year's net expansion of coal production in all India was 245,000 tons and more than half that additional output was made by the Native States. The chief mines in these States are the Umaria in Rewah State, Central India (worked by Government); the Singareni in the Naizam's Dominions (worked by a Joint Stock Company); and the Khost and Sharigh (worked by the North Western Railway) in Baluchistan.

30. BURMA.—Burma may so far be said to be making fast strides as a coal-producing country; it is the most recent addition to the list of producing provinces and has made greater progress than Madras in actual output, though the latter province has had a year's start. The outturn of the mines in Shwebo during 1894 was 12,111 tons compared with 9,938 tons in the previous year. This shows an increase on the output of 1893 of 21·86 and of 166·99 per cent. as compared with the average of the past three years (1891—1893).

31. MADRAS.—In Madras (Rachagarapalli Mines, in the Godavari District), although the quantity turned out is not large, compared with other provinces, coal production has shown a remarkable percentage increase which comes on the average of the three previous years (1891—1893) to 589·17 per cent. If capable of continuing an expansion of this nature, South India would in a very few years assume a distinct position in the coal supply of India. And indeed recent discoveries would seem to support the opinion that the Godavari coal fields have great possibilities.

32. PANJAB.—Unlike all the other provinces, the Panjab has manifested a decrease in the quantity of coal produced in 1894 as compared with the output of 1893 which comes to —14·0 per cent.

33. **Total Production.**—The following table may be here given of the production of coal during the past 17 years. The table is useful not only as giving a complete statement for the term of years indicated, but as exhibiting the period when each new source of supply came into the market. In 1878 it will be seen coal was obtained from two provinces only, *viz.*, Bengal and the Central Provinces, and the total output in that year was a little over 1,000,000 tons. Since then seven new centres of production have come into bearing and the supply has increased to 2,774,093 tons:—

Quantity, in Tons, of Coal Produced in the Provinces of India:—

Years.	Madras.	Bengal.	Panjab.	Central Provinces.	Assam.	Burma.	Central India.	Naizam's Dominions.	Baluchistan.	TOTAL.
1878	...	957,243	...	57,967	...	...	...	...	...	1,015,210
1879	...	891,047	...	33,515	...	...	...	...	...	924,562
1880	...	988,565	...	31,228	...	...	...	...	...	1,019,793
1881	...	930,203	...	67,527	...	...	...	...	...	997,730
1882	...	1,038,872	...	91,370	...	...	...	...	...	1,130,242
1883	...	1,200,957	...	115,019	...	...	...	...	...	1,315,976
1884	...	1,257,392	...	121,833	16,493	...	2,100	...	...	1,397,818
1885	...	1,123,700	...	119,116	43,707	...	7,698	...	...	1,294,221
1886	...	1,186,802	...	117,287	70,859	...	13,539	...	...	1,388,487
1887	...	1,319,090	7,523	128,981	89,302	...	15,497	3,259	411	1,564,063
1888	...	1,380,594	11,249	157,768	101,528	...	41,580	13,382	2,802	1,708,903
1889	...	1,541,356	22,835	144,465	116,676	...	52,956	59,646	8,238	1,946,172
1890	...	1,626,245	40,677	137,022	145,708	...	77,842	125,486	15,541	2,168,521
1891	20	1,747,122	60,714	141,736	154,208	...	69,741	144,668	10,368	2,328,577
1892	61	1,920,050	66,352	132,005	164,050	3,670	88,623	149,601	13,284	2,537,696
1893	502	1,870,720	77,294	135,118	164,420	9,938	94,348	157,421	20,094	2,529,855
1894	1,337	1,989,375	66,467	140,495	169,448	12,111	132,837	240,525	21,498	2,774,093

34. **Influence of Home Production on Imported (Foreign) Coal.**—The extension of mill industries, the opening of new railways, and the consumption by ocean steamers, have greatly increased the demand for Indian coal. This increase in demand has been met by greater home-

production. Indian coal may at the same time be said to be gradually taking the place of the foreign article. This will be seen by following table :—

Imports of Coal, Coke, and Patent Fuel from Foreign Countries.

Year.	Bengal.	Bombay.	Sind.	Madras.	Burma.	Total.		Total including Government Stores.		Percentage on value, of increase or decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	₹	Tons.	₹	
1889-90 .	23,170	435,755	32,279	62,666	47,800	601,670	13,085,897	656,867	14,292,390	—31·3
1890-91 .	10,047	632,926	54,274	50,818	36,599	784,664	15,434,420	817,004	16,058,153	+17·9
1891-92 .	22,812	566,231	54,799	45,094	48,088	736,971	12,504,927	773,624	13,085,912	—18·9
1892-93 .	12,831	504,083	37,077	66,380	27,814	648,185	11,414,503	703,341	12,519,578	— 8·7
1893-94 .	8,113	427,805	34,107	65,805	19,450	555,280	9,725,880	591,007	10,352,699	—14·7

The following were the imports during the ten years previous to 1889-90, *viz.* :—

Year.	Tons.	Year.	Tons.
1879-80	590,923	1884-85	741,129
1880-81	683,768	1885-86	790,930
1881-82	637,124	1886-87	765,668
1882-83	638,824	1887-88	848,878
1883-84	708,358	1888-89	833,478

These figures show conclusively that the imports of coal have not continued to expand with the increased demand, but, on the contrary, have declined by 33·37 per cent., during the past six years. Other significant features of these foreign imports may be said to be the fact that Bombay port usually takes 73·89 per cent. of the total foreign imports ; that last year's demands by Bombay were less than during any previous year for the past five years ; that the supply of foreign coal taken by Bengal and Burma has seriously declined ; and that the demands for foreign coal in Sind and Madras have practically remained stationary. The cause of the check given to the demands of Bombay for foreign coal may be looked for in the increased production at the mines in the Naizam's Dominions.

35. Coastwise Trade in Indian Coal.—The opinion has on more occasions than one been advanced by writers on the subject of Bengal coal, that a great impetus to the coastwise exports to the other sea-bound Provinces of India was given in 1893 through the strike of miners in England. The evidence in support of that opinion, in addition to the decline of the imports in foreign coal, already exhibited, may be said to be the actual returns of exports of Bengal coal to the other provinces of India and to foreign countries, displacing the British coal from markets which it previously held. The following table shows this trade during the past five years, and it will be observed that the rate of expansion both in 1892-93 and in 1893-94 was remarkably high. During the five years mentioned the exports of coal from Bengal to the other provinces have expanded from 52,463 to 242,169 tons, or 361·5 per cent.

Exports of Bengal Coal by Sea to other Provinces.

Year.	To Bombay.		To Madras.		To Burma.		Total.	
	Tons.	₹	Tons.	₹	Tons.	₹	Tons.	₹
1889-90 . . .	2,008	19,081	2,768	24,991	47,687	515,185	52,463	559,257
1890-91 . . .	4,000	47,000	29,763	298,901	69,908	651,073	103,671	996,974
1891-92 . . .	*Nil*	*Nil*	52,270	592,580	70,145	706,157	122,415	1,298,737
1892-93 . . .	45,595	454,259	60,570	718,093	88,611	903,019	194,776	2,075,371
1893-94 . . .	85,439	894,485	57,846	725,627	98,884	1,027,350	242,169	2,647,462

36. Exports of Indian Coal to Foreign Countries.—Co-existent with the interprovincial trade in Indian coal is the export trade with foreign countries which is already of a not unimportant character, and which is capable of being greatly increased. These exports have expanded from 39,962 tons in 1889-90 to 52,201 tons in 1893-94. Bengal coal finds a steady market in Ceylon.

COAL. Japan has entered as a competitor with England and India for the Asiatic markets, but India seems determined to hold the ground which she has gained.

The exports of Bengal coal to Foreign Countries are shown in the following table :—

Table showing the Exports of Bengal Coal to Foreign Countries: exclusive of Coke and Patent Fuel.

Year.	To Ceylon.		To China.		To Straits Settlements.		To Java.		To Mauritius and the West Indies.		To Arabia and Africa.		To other Countries.		Total.	
	Tons.	₹	Tons.	₹	Tons.	₹	Tons.	₹	Tons.	₹	Tons.	₹	Tons.	₹	Tons.	₹
1889-90	18,620	186,440	770	7,052	13,883	133,330	4,165	39,550	800	8,000	1,610	14,490	113	1,075	30,962	388,937
1890-91	15,157	150,947	*Nil*	*Nil*	5,869	59,667	4,000	40,000	575	5,712	*Nil*	*Nil*	702	7,044	26,303	263,372
1891-92	1,000	10,000	*Nil*	*Nil*	2,100	21,000	*Nil*	*Nil*	*Nil*	*Nil*	250	2,250	1,014	10,336	4,364	43,586
1892-93	13,379	136,230	*Nil*	*Nil*	3	150	*Nil*	*Nil*	1,518	13,358	*Nil*	*Nil*	720	7,050	15,620	155,788
1893-94	28,044	260,801	*Nil*	*Nil*	14,792	153,860	*Nil*	*Nil*	3,638	32,504	5,720	57,200	7	110	52,201	504,475

37. Internal Trade in Coal.—The railways use about one million tons of coal, so that the remainder of imports *plus* production are used up by the manufacturing industries of the country and by the shipping. Practically no coal is used in India for domestic purposes. The most tangible conception of the centres of production and consumption may be said to be obtained by a study of the returns of the Rail and River-borne Traffic. From the detailed statement (Appendix, pp. 42—43) it will be seen that while Bengal province imports from Calcutta and from Assam a comparatively speaking small amount (2,153,157 maunds in 1893-94), she heads the list of exporting provinces. Bengal is, therefore, the chief producing province. The North-West Provinces and Oudh, on the other hand, top the list of importing provinces, while they export only a small quantity to the Panjab. The North-West Provinces are, therefore, non-producing provinces, and further they are shown to draw their supplies from Bengal and from Rajputana and Central India. The third position in the order of value as importing provinces must be given to Bombay which annually drains for the support of its cotton mills, railways and other industries, foreign coal obtained from the port town and Indian coal from the Naizam's Dominions. And lastly the Central Provinces stand out among the importing provinces as taking annually fairly large quantities from the mines of Central India and Rajputana.

The total amount of coal shown as carried by the railways of Bengal leaves, however, a large balance on production that may be assumed as used up by the railways and other local industries, and therefore not returned as goods, but if we exclude this deficit it may be said Calcutta, which would appear to have taken 23,352,696 maunds of coal (very nearly all derived from the province of Bengal), and to have exported 1,145,311 maunds, thus retained a net surplus of 22,207,385 maunds to meet the local demands of the town and suburbs of Calcutta. It may almost be said that the most significant feature of the rail-borne traffic during the past five or six years has been the extent to which the mines in the Naizam's Dominions are contesting the Bombay markets with the imported coal. In 1889-90 the supply taken by Bombay from the Naizam's Dominions came to 704,534 maunds, last year (1893-94) it had expanded to 1,190,988 maunds. There seems no good reason why the local production of coal in India should not check entirely the imports into Bombay of foreign coal, just as local production has practically stopped the foreign supply that used formerly to be obtained by Bengal and Calcutta. But a similar influence of the mines in Central India and Rajputana has begun to be felt on the demands of the North-West Provinces. In 1889-90 these provinces drew from Central India and Rajputana 339,184 maunds, while last year their demands came to 1,280,654 maunds. In the same way the Central Provinces have very greatly increased their demands for Central India coal.

A study of the rail-borne traffic gives the conviction that it is not so much the increased total production that demonstrates the growth of India's independence of the world, in her necessities for coal, as in the fact that there is an adjustment taking place all over the Empire in the shares demanded by the various provinces. The interest in the new mines that are yearly being opened out is, for the present, not so much in their being additional sources of supply as in their becoming centres that are destined to lessen the charges of transport. They are in other words bringing coal more and more within the means of the manufacturing enterprise that is springing up all over the country. An increase in the number of centres of supply may, in fact, temporarily lessen or check the expansion of production at some of the older mines, but it is certain to greatly enhance consumption and to have a direct effect in hastening the extension of railways and of diffusing manufacturing enterprise throughout the country. Every mile of railway that is laid down must of necessity increase the demand for coal since it means an extension of the area of possible cheap supply.

38. Collieries.—In 1878 there were only 46 collieries in India, 44 of which were in Bengal and 2 in the Central Provinces. The output in that year was a little over one million tons, of which 957,243 tons were raised in Bengal. Twelve years later there were in all India 82 collieries: 73 in Bengal, 1 in the Panjab, 2 in the Central Provinces, 3 in Assam, 1 in Central India, 1 in Hyderabad (Deccan), and 1 in Baluchistan.

In 1894, the year under report, the number of collieries in India rose to 122, which were distributed as follows:—Bengal 108, Madras 1, the Panjab 2, Central Provinces 2, Assam 4, Burma 1, Central India 1, the Naizam's Territory 1, and Baluchistan 2. They gave employment to 42,521 persons, of whom 30,013 were male adults, 9,611 females and 2,897 children.

39. Properties of Indian and European Coals.—Some short time ago, 30 samples of Indian coal drawn from 23 mines were sent to the Imperial Institute, London. These were subjected to a careful examination and compared with standard samples of English, Welsh, Scotch and New South Wales coals. Full particulars will be found in *The Agricultural Ledger* No. 2 of 1895, but the

following two tables from the report may be here given as it is believed these convey the chief features brought out by the enquiry into the subject of Indian coals:— *COAL.*

Results of Analysis.

District or Province.	Mine.	Carbon.	Hydrogen.	Ash.	Moisture.	Sulphur.	Nitrogen, Oxygen, etc.
Assam	Makum	77·31	5·43	1·27	3·07	1·02	11·90
„	Cherra Punji	77·75	5·83	4·74	1·45	3·98	6·25
„	Maoflong	75·05	5·17	3·23	3·15	3·08	10·32
Baluchistan	Khost	71·38	4·97	5·57	3·85	4·82	9·41
		70·58	5·55	10·64	2·46	0·74	10·03
Bengal	Kumardabi	70 43	4·70	13·85	1·86	0·53	8·63
„ Karharbari	Lower Seam	80·75	4·32	7·37	1·23	0·42	5·91
	Upper Seam	83·53	4·59	5·35	1·28	0·40	4·85
„	Sodepore	72·09	4·87	9·03	3·54	0·29	10·18
„	Liakdee	75·33	4·60	9·29	2·23	0·53	8·02
Burma	Burma Coal Company	60·25	4·64	9·28	11·55	0·33	13·95
Central Provinces	Gadawarra	67·65	4·37	9·73	7·07	0·43	10·75

Composition of British and Australian Coal.

(For purposes of comparison.)

Coal.	Carbon.	Hydrogen.	Oxygen and Nitrogen.	Sulphur.	Ash.	Water.
Northumberland: Caking (mean of 4 samples)	80·29	5·32	11·79	0·91	1·68	Exclusive of water.
Welsh: Caking (mean of 3 samples)	83·00	5·75	7·84	0·77	2·64	
Welsh: Non-caking (mean of 4 samples)	86·92	4·39	4·30	1·28	3·42	
South Staffordshire: Caking (mean of 4 samples)	75·41	4·62	16·29	0·71	2·97	
Scotch: Non-caking (mean of 3 samples)	79·21	5·23	13·28	0·90	1·38	
New South Wales	77·65	4·94	10·63	0·58	3·28	2·95

It will thus be seen that in every respect, except in the greater amount of ash, the Indian coals are of a very high order.

References.—*Commercial Hand-book on Coal (Imperial Institute Series), No. 9 of 1893; Records, Geological Survey of Inaia, Vol. XX, Pt. 4 (1887), pp. 194—195; Vol. XXII, Pt. 3 (1889), pp. 167—171; Vol. XXIII, Pt. 3 (1890), pp. 120—124; Pt 4, pp. 237—258; l.c. pp. 267—269; Vol. XXIV, Pt. 1 (1891), pp. 99—119; Pt. 3, pp. 141—156; Pt. 4, pp. 212—217; Vol. XXV, Pt. 2 (1892), pp. 110—113; Pt. 3, pp. 161—163; Vol. XXVI, Pt. 4 (1893), pp. 148—164; Vol. XXVII, Pt. 1 (1894), pp. 16—33; Pt. 2, pp. 53—54; Pt. 3, pp. 86—100.*

III. IRON ORES (*Lohá, Hind.*)

40. Occurrence of Iron Ores.—Iron Ores exist all over India, especially in Madras, (as for example in the Salem, Bellary, and Kurnool districts) in the Central Provinces, (about Warora and Jabalpur) and in the hilly districts of Western Bengal. In Bengal only, however, where coal can be had in close proximity to the ore, is smelting carried on after European methods. *IRON.* *Conf. with page 36.*

41. Production of Iron.—During 1894, the total production of Iron in India (see Statement I., p. 36) was 38,390 tons. If compared with the previous year, that figure shows a slight improvement in outturn of 3·47 per cent., but, if the comparison be made between the recorded yield of 1894 and the average of the past three years (1891—1893), the increase becomes 23·29 per cent.

There is, however, reason to believe that very little, if any, reliance can be put on these figures. It is even possible that some of the returns refer to iron ore, and others to crudely manufactured pig iron. It very possibly takes from 45 to 60 cwts. of iron ore to make one ton of pig iron. Any confusion therefore of the nature indicated would render the statistics meaningless. But even were there no such error, the returns furnished would appear to be the actual records of certain transactions, which very possibly by no means denote the total production.

The primitive smelters that are scattered all over the country keep very little account of the amount of ore used by them in producing the crude iron which they dispose of to the local blacksmiths. So very general and widespread is this primitive smelting (of which it is believed no cognisance is taken in these returns) that it would be unsafe to assume that a province, shown in the Statement I. below, as producing no iron, has no local supplies of that metal. The absence of returns should rather be taken as denoting the absence of any large smelting furnaces. Though there are remarkably few large furnaces in the provinces of India, nearly every town has foundries and workshops, where Indian or imported pig iron and scrap iron are worked up. It is therefore probable, at least for some time to come, that statistics of the foundries and Native smithies would afford a more tangible conception of the iron interests of India than is conveyed by the tabulation of actual returns of indigenous ore.

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42. In BENGAL 24,759 tons of iron ore were reported as produced during the year, which would represent a decline of 17·27 per cent. on the output of 1893. As compared with the average of the last three years (1891—1893), however, the present year's figures show an increase of nearly 7 per cent. In the Financial and Commercial Statistics for British India, the Barakur Iron Works are shown as employing 714 persons and as producing 21,150 tons of iron, valued at ₹9,34,529. The iron there dealt with, judging from its price, was very possibly pig iron, and if made entirely from the local ore would have approximately represented 55,000 tons of ore. As against this calculation the actual figures of the ore worked up by that Company last year have been returned as 24,364 tons, valued at ₹78,746. The Railway traffic dealt with in paragraph 50 below shows an export of 12,751 tons which it may be presumed was mainly drawn from the Barakur production.

43. The output of iron ores in the CENTRAL PROVINCES shows an increase over last year's return of 85·5 per cent.; 6,181 tons having been produced as against 3,332 tons in the previous year (1893). The average yield of the past three years (1891—1893) was 4,566 tons, which compared with the return for the year under report shews an increase of production in that year of 35·37 per cent.

44. In MADRAS the industry though not large shows a rapid advance on the previous year's outturn, and also on the average of the last three years (1891—1893). But it is probable that the interest recently aroused in the subject of the iron ores of Salem (see Proceedings, Madras Board of Revenue, No. 240, dated 4th July 1895) is of even greater importance than the actual returns of the existing trade. The possibilities of Salem, Bellary, and other districts of Madras Presidency, in the supply of iron ores of a high quality, has led to the compilation of much useful information on the methods by which this might be utilised. Mr. Holland has reported that the quality of the Salem ore gives it a great natural advantage, especially in the manufacture of malleable iron and steel. Speaking of the approaching exhaustion of England's supplies from Spain, Mr. Holland remarks that it would even pay to export these ores to England, at least from such beds as those of Ongole, that are near the sea coast. It seems also probable that, as suggested in the *Memorandum on the Resources of British India* (published in 1894), it might even pay to convey these rich ores to be worked up on the banks of the Hugli—the difficulty of the want of a convenient supply of coal in Madras being alone the reason why so little progress has been made.

45. The Native States under the CENTRAL INDIA AGENCY return their iron ore production for the year under review as having been 2,685 tons valued at ₹1,01,424. That supply was obtained chiefly from Bijawar, Narwar, Panna and Chhatarpur. The average yearly outturn in these States during the three years (1891—1893) was 1,805 tons, the value of which was estimated at ₹1,15,945.

46. The year's production of iron ore in the Native State of MYSORE shows a substantial increase over that of 1893. In that year only 707 tons were manufactured, while in 1894, the year under report, the production rose to 972 tons, the rate of inrcease being therefore 37·48 per cent. If the production of 1894 be compared with the average outturn of the last three years (1891—1893), an expansion of over 100 per cent. will be seen to have taken place. It may be pointed out that although the ore (707 tons) raised in 1893 was estimated at ₹12,785, that produced in 1894 (972 tons) has been valued at only ₹7,871.

47. In RAJPUTANA the iron ore industry continues to make fair progress, as compared with other Native States. During 1894, ore weighing 774 tons was produced, as against 767 tons in the preceding year (1893). These figures show an increase over last year's production of nearly 1 per cent., and over the average outturn of the three years (1891—1893) of over 10 per cent.

48. In the returns received from the NAIZAM'S DOMINIONS of iron ore produced in that State, the value of the ore is given, but not the quantity. The value of the ore raised in 1894 is returned at ₹2,813, the value of outturn for 1893 and that of the average of the last three years being, respectively, ₹3,442 and ₹3,816. Here will be noticed a falling off of 18·26 per cent. in value of ore produced in 1894, as compared with value of the outturn in 1893. If compared with value of the average of the last three years, a further decline of 26·28 per cent. is shown.

49. Foreign Trade in Iron.—The following table shows the value of imports of iron and steel (including Government Stores) from foreign countries during the five years ending 31st March 1894:—

Imports of Iron and Iron Manufactures.

DESCRIPTION OF ARTICLE.	1889-90.	1890-91.	1891-92.	1892-93.	1893-94.
	₹	₹	₹	₹	₹
Iron, wrought and unwrought	25,572,666	28,024,022	25,559,937	27,358,470	26,934,722
Steel	3,427,805	4,896,496	4,836,813	4,134,884	6,500,891
Hardware and Cutlery	11,772,749	12,795,705	13,479,007	13,412,774	14,245,653
Machinery and Millwork	24,914,284	21,604,832	21,800,188	24,778,351	26,070,281
Railway plant	29,070,862	32,367,859	25,054,709	23,219,895	23,345,628
TOTAL	94,758,366	99,688,914	90,730,654	92,904,374	97,097,175

The exports of iron and iron manufactures from India to foreign countries are not important. The following figures represent the value of exports during the past five years:—

Exports of Iron and Manufactures thereof. (Indian Produce and Manufacture.)

DESCRIPTION OF ARTICLE.	1889-90.	1890-91.	1891-92.	1892-93.	1893-94.
	₹	₹	₹	₹	₹
Iron, wrought and unwrought	72,228	91,696	86,963	97,620	80,056
Steel	...	...	...	...	...
Hardware and Cutlery	110,554	102,579	109,951	99,078	84,042
Machinery and Millwork	917	6,179	1,246	2,940	540
Railway plant	...	...	...	...	...
TOTAL	183,699	200,454	198,160	199,638	164,638

50. Internal Traffic in Iron.—In the returns of the Rail and River-borne Trade (see Appendix, pp. 44—45) some conception is given of the magnitude of the traffic in iron. If these figures of weight be assumed as relating to pig iron, in order to arrive at some comparison of their relation to the Indian production of ore, they would very possibly have to be multiplied by at least 2½. But it is highly significant that even as the figures stand the Railway returns alone show a traffic in Iron nearly ten times the magnitude of local production. The total exports from the provinces and port towns came last year to 251,946 tons; of these by far the most important items are the exports from Calcutta and Bombay. These may be assumed to be mainly if not entirely imported (Foreign) iron. The Calcutta supply of 1893-94 was sent to Bengal Province (42,611 tons), to the North-West Provinces (39,619 tons), to the Panjab (2,788 tons), to the Central Provinces (2,058 tons), to Assam (7,171 tons), and to Rajputana and Central India (304 tons). The Bombay supply which was drawn from the port town went to the Bombay Presidency (35,482 tons), to Madras (528 tons), to the North-West Provinces (4,536 tons), to the Panjab (3,810 tons), to the Central Provinces (5,197 tons), to Berar (4,265 tons), to Rajputana and Central India (7,415 tons), to Naizam's Dominions (4,177 tons), to Mysore (749 tons), and to Madras seaports (187 tons). The only provincial export of consequence is that of Bengal. Of the local produce 7,173 tons went to Calcutta, 4,551 tons to the North-West Provinces, 666 tons to the Panjab, 176 tons to the Central Provinces, 132 tons to Assam, and 53 tons to Rajputana and Central India. The rail-borne traffic thus supports the view already put forward that the returns of production are very possibly considerably under the actual, even when every allowance is made for the re-exporting from province to province of foreign iron. Some doubt may be entertained as to the nature of these rail-borne returns, but it seems probable that they all relate at least to pig iron, and not to iron ore.

51. Coastwise Trade in Iron.—The two following tables may be given in order to show the traffic coastwise in both Indian and Foreign iron :—

Coastwise Trade in Iron—Imports.

Year.	Description.	Into Bengal.	Into Bombay.	Into Sind.	Into Madras.	Into Burma.	Total.
		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1889-90	Indian	64	362	43	221	72	762
	Foreign	379	8,594	1,671	4,949	1,207	16,800
1890-91	Indian	31	504	56	68	20	679
	Foreign	796	10,618	1,196	5,071	2,100	19,781
1891-92	Indian	178	1,112	17	196	64	1,567
	Foreign	3,779	4,920	1,677	6,154	1,914	18,444
1892-93	Indian	98	813	19	194	70	1,194
	Foreign	3,962	4,332	812	5,302	2,674	17,982
1893-94	Indian	70	606	7	336	34	1,053
	Foreign	990	4,559	955	5,163	2,117	13,784

Coastwise Trade in Iron—Exports.

Year.	Description.	From Bengal.	From Bombay.	From Sind.	From Madras.	From Burma.	Total.
		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1889-90	Indian	95	821	5	15	1	937
	Foreign	1,310	12,262	622	1,517	892	16,603
1890-91	Indian	166	853	9	80	1	1,109
	Foreign	1,647	16,255	811	824	1,312	20,849
1891-92	Indian	859	856	3	32	3	1,753
	Foreign	1,703	16,192	325	3,367	1,658	23,245
1892-93	Indian	549	895	57	27	5	1,533
	Foreign	2,189	14,592	224	1,831	2,083	20,919
1893-94	Indian	605	1,342	1	29	2	1,979
	Foreign	1,978	18,998	247	827	1,762	23,812

It thus may be inferred that the exports of Indian iron coastwise, although comparatively small in amount at present, are, on the other hand, steadily increasing. In 1889-90 there were exported coastwise a little over 900 tons of Indian iron, while in 1893-94 the total quantity so

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exported rose to not far short of 2,000 tons. The volume of coastwise trade in the home article has thus more than doubled itself in the space of five years (1889-90 to 1893-94).

REFERENCES.—*Commercial Hand-book on Iron (Imperial Institute Series) No. 8 of 1892; Records, Geological Survey of India, Vol. XX, Pt. 4 (1887), pp. 167—170; Vol. XXII, Pt. 4 (1889), pp. 216—226; Vol. XXV, Pt. 3 (1892), pp. 135—159.*

IV. PETROLEUM (*Mitti-ka-tél, Hind.*)

PETROLEUM.
Conf. with page 37.

52. Production of Petroleum in India.—The Provinces in India that produce Petroleum are Burma, Assam, the Panjab, and Baluchistan. The total quantity of mineral oil yielded in all India (Statement I., p. 37) during 1894 was 11,139,597 gallons, being an increase on output in 1893 of 7·52 per cent., or of 32·13 per cent. on the average yield of the past three years.

53. BURMA.—In Burma the output is rapidly increasing. During 1894, 10,920,951 gallons were obtained, compared with 10,276,218 gallons in the previous year. These figures show an increase over the production in 1893 of 6·27 per cent., or an increase over the average quantity during the last three years (1891—1893) of 31·32 per cent. The following remarks on the mineral oil industry in Burma are reproduced from the *Report on the Administration of Burma, 1893-94*:—

> The total output of petroleum from oil-wells in Burma in 1893 was 10,276,218 gallons against 8,698,424 gallons in 1892. Of this quantity Arakan contributed 256,701 gallons, against 308,091 in 1892, and the Southern Division 10,019,517 against 8,390,333. In the Kyaukpyu District an impetus was given to the oil industry by the abolition of a rule prohibiting the sinking of new wells within 300 feet of old ones without the consent of the owner of the old well. This rule was made in 1880 for the purpose of protecting existing interests. Subsequent experience in the Yenangyaung oil-field showed that new wells can be sunk at a distance of 60 feet from existing wells without reducing the output from the latter. The 300 feet rule was accordingly abolished, and a rule substituted which fixed the distance between wells at 60 feet. In the Southern Division the oil industry is in the hands of the Burma Oil Company and of Native workers. The Burma Oil Company received during the year a lease of one square mile of land supposed to be oil-bearing in the Minbu District. Negotiations were in progress during the year for the lease of a large area to a Syndicate represented by Messrs. Gillanders, Arbuthnot & Co. These negotiations have not yet resulted in the issue of a mining lease.

In connection with the subject of Burmese Petroleum may be noticed paraffin wax, which is mentioned in the *Review of the Trade of India, 1893-94*, by Mr. J. E. O'Conor, C.I.E., as produced in the factory worked at Rangoon for the refining of Burma Petroleum. This new trade has developed during the last five years from 396 tons, value ₹1,10,620, exported in 1889-90 to 1,443 tons, value ₹5,07,790, in 1893-94. It is exported almost exclusively to the United Kingdom. The refined oil from which it is produced does not find any market worth mention outside of India, but in India there is an active demand for it.

Petroleum is said to have been worked in Burma for upwards of 2,000 years, and there appears to exist an unfailing supply in many parts of the Province. Much of the oil is of very high quality and can be burned in lamps even in its crude state. The only wells that are at present worked on European methods are those of Messrs. Finlay, Fleming & Co., at Kodung, but operations have not as yet been extensively established. There is, however, a wide field for capital and enterprise in the working of the petroleum of Burma, and the highest expectations may be entertained of the future of this industry.

Chemical qualities of Petroleum from Burma.—The subjoined table, which is extracted from a Note by Professor Engler, translated by Dr. F. Noetling, of the Geological Survey of India (*May 1894*), shows the composition of various samples of crude oil from Upper Burma:—

	Light oils (below 150° C.).	Illuminating oil (150° to 300° C.).	Lubricating oil and paraffin wax.	Remainder and loss.
I. Petroleum from Yenangyat Well No. 15	17·8 vol. %	49·4 vol. %	30·8 vol. %	2 vol. %
I. " " " (mixed)	18·6 " "	49·6 " "	28·3 " "	3·5 " "
II. " " Kodoung	4·3 " "	38·8 " "	50·4 " "	6·5 " "
III. " " Twingon	5·5 " "	38·8 " "	48·7 " "	7 " "
IV. " " Minbu	...	...	76·7 " "	21·3 " "

"It must be specially noted that the oil samples I, II, and III, while being of a viscous character at ordinary temperatures, contain a high percentage of lighter oils, especially illuminating oil. Up to now I have never found similar oils, which being of the same consistency, contain such a high percentage of illuminating oil."

54. ASSAM.—The returns of output in Assam, though the totals are comparatively speaking small, give an even greater advance than the corresponding figures for Burma. During the year under report, 166,904 gallons of petroleum were raised as against 81,742 gallons for the previous year, or an increase of 104 per cent. Compared with the average output of the last three years (1891—1893), the figures for 1894 thus manifest an increase in yield at the rate of nearly 300 per cent. As showing the interest which continues to be taken in the exploration of the oil-bearing districts of Assam, it may be mentioned that in 1893-94 a new lease for a petroleum concession in the district of Lakhimpur was granted to the Assam Oil Syndicate. It is also understood that a refinery is at present under construction so that it may be confidently expected the future will mark great progression.

55. BALUCHISTAN.—In Baluchistan, judging purely from the returns furnished by the local authorities, the oil supply would appear to be declining. Thus, for example, the output for 1894 has been returned at 50,000 gallons, while the average yield for the two years, 1891 and 1892, was 70,622 gallons. But either these wells were not worked in 1893, or returns of their production have not been furnished, so that a comparison would be misleading.

56. PANJAB.—The development of the oil supply of the Panjab does not appear to be making progress. During 1894, only 1,742 gallons were turned out. These figures manifest a decline on

those of the previous year of 5·93 per cent. and of 16·37 per cent. on the average of the past three years.

57. Prospects of Indian Petroleum.—If it be found possible to produce this oil at paying rates and in sufficient quantity, the home market would be almost limitless. The consumption of mineral oil in India is increasing with marvellous rapidity. The imports of foreign mineral oils rose from a valuation of ₹5,98,797 in 1870-71 to ₹48,70,580 in 1880-81 and to ₹85,18,279 in 1885-86.

The imports during the five years ending 1893-94 were as follows :—

Imports of Kerosine and other Mineral Oils.

Year.	Gallons.	₹
1889-90	53,390,158	2,47,88,265
1890-91	54,235,275	2,36,22,192
1891-92	58,109,283	2,36,81,405
1892-93	67,085,968	2,69,02,640
1893-94	86,608,560	3,27,55,852

In the *Review of the Trade of India, 1893-94*, Mr. J. E. O'Conor, C.I.E. remarks :—

The trade is now one of considerable importance, the imports last year reaching to a value of Rx. 3,275,585. The imports, however, were greatly in excess of the demand, and it is improbable that the trade of the present year will be as large as was that of last year.

58. Internal Traffic in Petroleum.—From the returns of Rail and River-borne Trade, a detailed statement of which is given below (Appendix, pp. 46—47), it will be seen that Calcutta heads the list of exporting centres. During the year 1893-94 Calcutta imported by Rail and River only 1,073,360 gallons of Kerosine oil, while she exported 8,366,536 gallons as follows :—To Bengal (7,203,176 gallons), to the North-West Provinces and Oudh (66,280 gallons), to the Panjab (14,528 gallons), to the Central Provinces (9,104 gallons), to Assam (1,070,608 gallons) and to Rajputana and Central India (2,840 gallons). Following Calcutta is Bombay with imports by rail and river of 2,389,448 gallons, and exports 5,765,616 gallons, which were distributed thus :—To Madras seaports (10,104 gallons), to Bombay Presidency (2,388,776 gallons), to the North-West Provinces and Oudh (95,576 gallons), to the Panjab (96,912 gallons), to the Central Provinces (833,928 gallons), to Berar (1,033,728 gallons) to Rajputana and Central India (919,784 gallons), to Naizam's Dominions 328,288 gallons) and to Mysore (58,488 gallons)

59. Coastwise Trade in Petroleum.—In conclusion it is only necessary to exhibit the traffic coastwise. This may be done by means of the following tables. It will be seen that an endeavour has been made to show separately the yearly imports and exports of (*a*) Kerosine, (*b*) Other kinds of Mineral Oil, under the two headings (1) Indian Produce and Manufacture, (2) Foreign Merchandise.

Imports Coastwise of Indian and Foreign Kerosine and Other kinds of Mineral Oil.

Year.	Description.		Into Bengal.	Into Bombay.	Into Sind.	Into Madras.	Into Burma.	Total.
			Gals.	Gals.	Gals.	Gals.	Gals.	Gals.
1889-90 . . .	Kerosine . .	Indian . .	62,733	...	...	180	...	62,913
	Ditto . .	Foreign . .	390,447	2,204,246	371,880	982,517	422 198	4,371,288
	Other kinds . .	Indian . .	747,919	3,466	...	9,200	228,658	989,243
	Ditto . .	Foreign . .	135	533	100	437	63	1,268
1890-91 . . .	Kerosine . .	Indian . .	42,512	...	...	560	...	43,072
	Ditto . .	Foreign . .	526,179	2,020,874	517,456	1,550,850	400,059	5,015,436
	Other kinds . .	Indian . .	773,170	4,183	...	10,355	183,599	971,307
	Ditto . .	Foreign . .	3,649	3,053	...	1,339	1,070	9,111
1891-92 . . .	Kerosine . .	Indian . .	21,017	...	...	3,034	...	24,051
	Ditto . .	Foreign . .	681,197	1,907,229	48,944	1,560,444	464,597	4,662,411
	Other kinds . .	Indian . .	1,131,112	5,352	...	11,716	254,268	1,402,448
	Ditto . .	Foreign . .	3,080	27	913	10,508	4,560	19,088
1892-93 . . .	Kerosine . .	Indian . .	...	...	...	53,115	84,072	137,187
	Ditto . .	Foreign . .	652,810	3,144,367	43,886	1,898,697	509,894	6,249,654
	Other kinds . .	Indian . .	1,197,467	5,328	...	23,074	230,197	1,456,066
	Ditto . .	Foreign . .	2,229	780	503	16,252	10,190	29,954
1893-94 . . .	Kerosine . .	Indian . .	...	...	...	4,932	188,408	193,340
	Ditto . .	Foreign . .	619,094	3,421,391	394,672	2,756,085	442,436	7,633,678
	Other kinds . .	Indian . .	1,376,402	4,971	...	16,530	195,156	1,593,359
	Ditto . .	Foreign . .	4,579	408	4,486	27,300	8,385	45,158

PETROLEUM. ***Exports Coastwise of Indian and Foreign Kerosine and Other kinds of Mineral Oil.***

Year.	Description.		From Bengal.	From Bombay.	From Sind.	From Madras.	From Burma.	Total.
			Gals.	Gals.	Gals.	Gals.	Gals.	Gals.
1889-90	Kerosine	Indian	7,490	2	...	134	1,125,678	1,133,304
	Ditto	Foreign	448,740	5,779,695	42,152	146,085	423,350	6,840,022
	Other kinds	Indian	...	...	...	...	...	...
	Ditto	Foreign	1,271	3,357	510	1	663	5,802
1890-91	Kerosine	Indian	5,831	...	...	400	1,010,611	1,016,842
	Ditto	Foreign	569,204	6,288,130	18,596	116,138	387,702	7,379,770
	Other kinds	Indian	...	...	...	...	...	...
	Ditto	Foreign	55	16,235	80	112	666	17,148
1891-92	Kerosine	Indian	2,867	...	...	4	...	2,871
	Ditto	Foreign	765,627	6,003,240	50,779	132,401	459,263	7,411,310
	Other kinds	Indian	5,045	...	...	...	1,430,580	1,435,625
	Ditto	Foreign	540	20,725	...	125	4,281	25,671
1892-93	Kerosine	Indian	364	...	...	224	171,679	172,267
	Ditto	Foreign	696,261	7,535,020	496,388	49,592	475,242	9,252,503
	Other kinds	Indian	3,500	...	...	...	1,456,103	1,459,603
	Ditto	Foreign	18,229	32,391	...	558	275	51,453
1893-94	Kerosine	Indian	...	...	...	112	285,776	285,888
	Ditto	Foreign	760,202	10,525,863	31,489	74,594	405,395	11,797,543
	Other kinds	Indian	6,2 4	...	...	...	1,582,724	1,589,018
	Ditto	Foreign	8,225	61,261	47	76	3,388	72,997

REFERENCES.—*Records, Geological Survey of India, Vol. XXII, Pt. 2 (1889), pp. 75—136; Vol. XXIV, Pt. 2 (1891), pp. 84—97; Vol. XXVII, Pt. 2 (1894), pp. 49—53; Vol. XXVIII, Pt. 2 (1895) pp. 55—58.*

Statement II.

MINERALS REGARDING WHICH DEFINITE STATISTICS CANNOT BE FURNISHED.

60. The information called for under this statement was intended to amplify and, if possible, bring up to date the returns published in previous Reviews regarding the more important minerals for which definite statistics are not available. The returns for the year 1894 in most cases affirm that nothing further can be said regarding the majority of these minerals than has already been published. It is not, therefore, deemed necessary to express the information called for under the prescribed Statement II in the form of Statistical Tables.

V. GOLD *(Soná, Hind.)*

GOLD.

61. Occurrence.—Gold may be said to be found in the following localities:—

(1) MADRAS.—Madura, Coimbatore, Salem, Wynaad, Nilgiris, Travancore, Malabar, South Kanara, North Arcot, and Bellary.

(2) MYSORE.

(3) HYDERABAD.

(4) BENGAL.—Orissa, Midnapur, Bankura, and Champarun districts; Chutia Nagpur, Manbhum, Singbhum, Udaipur, and Darjeeling. Dr. F. Noetling published a report of the Sonapet gold-field in the Records of the Geological Survey of India (*Volume XXIII, Part 2, 1890*), which should be consulted.

(5) CENTRAL PROVINCES.—Chhattisgarh, Nagpur, Jabalpur divisions, and Upper Godavari district.

(6) CENTRAL INDIA.—Ajmere-Merwara district.

(7) BOMBAY.—Dharwar, Belgaum, and Kaladgi districts and Kathiawar.

(8) PANJAB.—Bannu, Peshawar, Hazara, Rawalpindi, Jhelum, Kangra, Umballa, Gurgaon, and Hoshiarpur districts.

(9) NORTH-WESTERN PROVINCES.—Bijnor, Naini Tal, and Garhwal districts. The system pursued is the washing of sand in the river basins, more especially those in the Nagina tahsil of Bijnor district.

(10) ASSAM.—River-sands, especially of Lakhimpur district.

(11) BURMA.—Throughout the greater part of Lower Burma, especially in the river-sands of Tenasserim, and in Upper Burma in several districts, particularly in Katha. It also occurs in Ruby mines district (in Momeik) and is obtained chiefly in the shape of dust in the dry nullahs in the Engdaing jungles. In Yeu it is found in small quantities by washing in the Shwegyin and Tazè townships, also in Indaing township.

62. **Outturn.**—A definite statement of the annual production of gold for the whole of India cannot be furnished. Washing of auriferous beds takes place here and there all over the country. It is purely a native industry, and it is therefore impossible to obtain statistics that could be advanced with any degree of assurance. The industry of gold-washing is, moreover, often spasmodic, a sort of by-product with certain communities. The amount of gold dust so produced is, however, remarkably small, and no very serious error would be involved were the gold production of India accepted as exemplified by the returns of the few mines that are conducted on European principles. The particulars furnished to the writer regarding gold-washing may be said to perfect in some instances former returns, but more with the view of arriving at a figure of average annual outturn than of giving particulars of actual production.

The following table may be accepted as expressing approximately the amount of gold produced in India during 1893 and 1894 :—

Localities.	1893.		1894.	
	Ounces.	Rupees.	Ounces.	Rupees.
Madras	961*	50,565	961*	50,565
Mysore	201,375	1,25,27,668	210,082	1,42,53,856
North-Western Provinces	74	5,031	57	3,702
Panjab	447*	22,612	447*	22,612
Kashmir	26	975	35	1,503
Hyderabad	73†	2,200†	99	2,970†
Burma	32	1,800	89‡	5,000
Bengal	1	100	...	...
TOTAL	202,989	1,26,10,951	211,770	1,43,40,208

* Originally returned as the production of 1891, and not subsequently modified; may be accepted as the mean annual production.

† Corrected by subsequent communication from 57 oz. valued at £170 (the figures quoted in last year's Review); the valuations of 1893 and 1894 were given at £220 and £297 respectively. As a matter of convenience these figures have been quoted above at the conventional rupee.

‡ Value only furnished: the quantity has been estimated on the ratio of previous quotations.

63. **Increased Production.**—The most satisfactory feature of India's gold production may be said to be the steady progression of the six mines in Mysore. In 1891 these mines were returned as having produced 106,921 oz., valued at ₹57,73,738, and in 1892, 163,187 oz., valued at ₹98,96,020. Within the past four years therefore they have very nearly doubled their poduction. The most important mines are the Mysore Gold Mining Company, the Urigam Gold Mining Company, the Champion Reefs Mining Company, the Nandidrug Mining Company, the Balaghat Mining Company, and the Indian Consolidated Company etc. Recently a company (The Mysore Reefs Gold Mining Company) has been started in North Arcot with a capital of £200,000, but their outturn has not as yet been published. Since 1889 some 21 grants and licenses for gold prospecting, etc., have been issued.

The following table shows the Imports and Exports between India and foreign countries during the past five years :—

Table showing Total Imports and Exports of Gold.

Year.	Imports.		Exports.	
	Ounces.	Value in Rupees.	Ounces.	Value in Rupees.
1889-90	850,232	50,710,273	76,848	4,557,235
1890-91	1,175,875	65,008,317	161,646	8,646,600
1891-92	709,102	41,189,291	285,454	17,051,369
1892-93	272,442	17,817,891	726,925	45,944,720
1893-94	474,635	31,465,300	378,399	25,952,840
Average of past five years	696,457	41,238,214	325,854	20,250,552
1852-53	...	£1,341,106	...	£168,805
1872-73	...	£2,622,371	...	£79,000

GOLD.

Not including the gold that exists in India in the form of coin, the traffic in the metal since 1835-36 may be said to show a net import of approximately £150 millions. The exports of gold have rapidly increased coincidently with the extreme fall in the value of silver.

REFERENCES.—*Records, Geological Survey of India, Vol. XXII, Pt. 1 (1889), pp. 17—39; Vol. XXIII, Pt. 2 (1890), pp. 73—78.*

PRECIOUS STONES.

VI. AMBER (*Kah ruba, Hind.*).

AMBER.

64. Occurrence.—The only locality in India where Amber (a fossilised resin) is known to occur with any certainty is in the Hukong Valley of the Bhamo district of Upper Burma. Since the annexation of that province the right to collect the duty on the mineral (5 per cent. *ad valorem*) has been sold by auction, together with that of Jade licenses.

65. Outturn.—The outturn in 1894 has been returned at 87℔, valued at ₹160. That for 1893 was given as 549 cwt., valued at ₹2,900. In explanation of the variation in the price, the Deputy Commissioner states that in 1894 Amber was reported as obtained in one month only, whereas in 1893 the price varied from month to month, ranging from ₹2 to ₹20 per *viss*. He states, moreover, that the outturn for 1893 was doubtless incorrect, and that in this matter accuracy cannot be expected in the returns. The price at the mines usually averages from ₹6 to ₹15 a *viss* (= 3·65℔), and in Mandalay from ₹15 to ₹40. The yellow form is more rare than the red.

The Amber mines are worked by Kachins in a fitful and haphazard manner. In excavating, a shaft is sunk for 70 to 80 feet. Should the miners be fortunate enough to strike a vein, a side passage is made following the vein. At certain points lumps may be found which sometimes weigh as much as 1,000℔. These blocks of Amber are carefully removed, then sawn into the required shape and size.

66. Medicinal Form.—A variety of Amber called *Payinswe* used to be sold by the miners to the Chinese and taken to China, where it is used as a medicine.

VII. BERYL—EMERALD (*Sabzá, Panoca, Fastiki Kerasi, Hind.*)

BERYL.

67. Occurrence.—This mineral is not alluded to in any of the reports obtained for the year 1894. There is a famous old mine in Coimbatore district in Madras Presidency, but it is not now worked. The mineral is also found in several localities of the Panjab Himalaya, and its occurrence in isolated positions throughout Rajputana has been repeatedly published, but as yet no industry has been organised for its utilisation.

VIII. DIAMOND (*Hirá, Hind.*)

DIAMOND.

68. Occurrence.—Diamonds are known to be found over six areas, *viz.* :—

(1) The Kistna valley side of the Deccan.
(2) The Madras Presidency, in the districts of Anantapur, Cuddapah, Kurnool, and Godavari (Ellore).
(3) Chutia Nagpur in Bengal.
(4) The Central Provinces.
(5) Bundelkhand.
(6) Hyderabad.

69 Particulars of Mining and Washing.—While the gems actually do occur in the regions named, or have been reported as found, the industry of mining or washing for diamonds can hardly be said to be a flourishing one anywhere in India. The least important localities may be said to be Chutia Nagpur and the Central Provinces. Indeed, the reputation of diamonds in Chutia Nagpur may be regarded as highly doubtful. Diamonds were, however, formerly found in the neighbourhood of Hirakhoond in the Sambalpur district of the Central Provinces, where, in the days of Native rulers, operations were regularly prosecuted by damming and washing to search for the gems. The work was in the hands of professional diamond-washers known as *Jhirias*, who were liberally rewarded by grants of land for valuable finds.

A lease was granted by the Government to a syndicate of capitalists to search for diamonds in and near the Mahanadi above the town of Sambalpur, but its operations proved a failure. It is thought that diamonds may also be found in some of the crystal pits near Gorpur, Kobra, Dhundee Towa in the Betul district, and near Pattan in the Multai tahsil of the same district, but no precise information is available.

The Hyderabad (Deccan) Company have carried on exploratory workings at certain localities in the Hyderabad State with partial success. From their workings over 3,000 diamonds have been obtained, but the stones being minute, the proceeds obtained bore an unsatisfactory relation to the outlay incurred. The Company claim to have found old workings at certain places in the Ghanpura Circar, but the nature and capacity of these deposits remain to be exploited The most recent returns of the Deccan Diamond workings are those of 1891, when the outturn for the Hyderabad State was put at 862¾ carats, valued at ₹15,530. From the Kistna valley side of the Deccan, the outturn for the two years 1888 and 1889 is recorded as 93 carats, valued at ₹108. Later operations have, however, increased this considerably. No statistics are obtainable from the other districts of the Madras Presidency. It is said that the supply from the Ramalcotta washings has been unremunerative. Diamonds are met with near Banganapalle on 400 acres of land bordering the river, but there has been no industry for some years past.

The value of the diamonds extracted from the mines in Bundelkhand during the year 1893 was put at ₹20,549, and the report of the past year's workings (1894) shows a production of 210¾ carats, valued at ₹16,251-8-3. These diamonds are mostly obtained on the Panna plateau which is shared by several Native States. Occasionally a few stones are carried by the rains down

to the plains and are there to be found by superficial washings. Production in Bundelkhand fluctuates very greatly. There are no State works and no capital expended, consequently a shaft once sunk has to be abandoned after the rains, from want of machinery to keep it open. The method of procedure is accordingly mostly by superficial mines which are worked during the rains, since no water is available during the hot season. *DIAMOND.*

REFERENCES.—*Records, Geological Survey of India, Vol. XXII, Pt. 1 (1889), pp. 39—49; Vol. XXIII, Pt. 2 (1890), pp. 69—70.*

IX. GARNET (*Yáqút, Chunri, Mehtab, Hind.*)

70. Occurrence.—The Garnet is common in various localities in India, those of Rajputana being the most important. The stones found in South Canara and Salem districts of the Madras Presidency have been pronounced as practically of no value, and those of Monghyr district in Bengal are so much fractured, that they do not appear to be marketable. *GARNET.*

Garnets are fairly abundant in Burma, as, for example, throughout the Mogôk township, in the eastern and hilly portion of Twinnge township of the Ruby Mines district, and also in parts of Momeik States.

71. Trade in Garnets.—The Garnets of Rajputana are, however, of considerable value. The stone is met with in the Bhilwara district of Meywar. The revenue derived last year (1894) from this source was ₹3,549. The mines at Sarwar in the Kishengarh State, Rajputana, are being constantly worked, and yield an average annual revenue of ₹2,500. These mines are generally worked by the local Jogis and Malis, who are great experts at prospecting for Garnet mines. The Sarwar garnets are considered the best in Rajputana, and are greatly prized, on account of their deep pink brilliant colour, for making jewellery, of which there is a flourishing industry at Sarwar. There are some fifteen manufactories of carbuncle jewellery worked by the local Muhammadans, who sell to the Mahajan traders, from whom the European firms and exporters receive their supplies.

X. JADE and ADEITE (*Yashm, Hind.*)

72. Occurrence.—A stone known in commerce as Jade is extensively worked in the Mogoung sub-division of the Bhamo district, and in the Upper Chindwin and Katha districts of Upper Burma. Its colour varies from pearly grey to dark green. It is in very general demand throughout China. A variety highly prized by the Chinese is pale grey, with bright apple-green spots, clouds, and veins. A block of less than a cubic yard in size was some years ago valued in Rangoon at £10,000, and the Chinese are said to have offered £8,000 for it. *JADE.*

The Bhamo Jade-producing country is by far the most important. It may be described as a region lying between the 25th and 26th parallels of latitude, and shut in by the Chindwin and Mu rivers on the west and east respectively. The mines now being worked are known as Tawmaw, Paungmo, Iku, Matiemmo, and Nienmo. The Tawmaw quarries have been worked for several years, but the stone is by no means exhausted. The Jade quarries of Katha district are situated about 12 miles north of the Mawhun hill, some 60 miles from the head-quarters of the district. The Jade extracted from these quarries is inferior to that produced in Bhamo, where the present mines yield a better class of stone than in 1892.

73. Production.—The outturn at Bhamo in 1894 was estimated at 727 cwt., valued at ₹1,15,091. A royalty of 33⅓ per cent. is levied on all Jade-stone extracted in Upper Burma. The right to collect this duty, together with the duty on Amber, is sold annually by auction. The licensee for the year 1892, a Chinaman, purchased the privilege for ₹36,000.

A fine green stone, probably Jadeite or Jasper, is found at Mohgaon in the Sanson tahsil of the Chhindwara district of the Central Provinces, and appears to have been worked at some remote period.

74. Total Indian Trade.—The quantity of Jade-stone exported by sea during the year 1893-94 amounted to 2,270 cwt., valued at ₹4,34,650; the trade thus showed a decline of nearly one thousand cwt. on that of the year preceding.

FALSE JADE.—A considerable amount of a stone known as False Jade (a form of serpentine) is annually imported into the Panjab from Afghanistan. It is said to be found near Kandahar and to be brought down the Indus to Attock on rafts floated with inflated skins. It is conveyed to Bhera in the Shahpur district, where it is manufactured into knife-handles. This stone is known as *Sang-i-Yesham.* It is cut by iron saws and water mixed with red sand and pounded emery (*kurand*).

XI. QUARTZ (*Chakmak, Hind.*)

75. Occurrence.—This mineral which includes rock-crystal, amethyst, cornelian, jasper, onyx, etc., occurs in the Monghyr district of Bengal, and is extremely common in the Hyderabad State. *QUARTZ.*

On the subject of quartz in the Monghyr district, Messrs. Steven Ambler & Co., of Jamalpur, write as follows:—

"Quartz occurs running in regular veins parallel to the lines of bedding and throughout the conditions are such as occur in gold-bearing quartz, and such as would warrant an exploration to search for that metal."

This mineral is also found in the Salem district of Madras as veins of very pure quality, unstained by iron. The Elephant Rock in the lower slopes of Shevaroys is also a magnificent mass of pure white quartz. The stones found in Coorg are mainly used for metalling roads. Gold-bearing quartz occurs in the Katha district of Upper Burma.

ONYX (*Sang-i-Sulemāni*, Hind.) are found plentifully in the crystal pits in the Betul district, and there is a band of coarse Onyx near Amerwara in the Chhindwara district.

AGATE (*Yamni, Akik*, Hind.), onyxes, etc., are found in the beds of the Narbada Bhima, Godavari, and Kistna rivers.

QUARTZ.

ROCK-CRYSTAL (*Billaur*, Hind.) occur in the Patna Feudatory State in the Sambalpur district; there are some good specimens in the Nagpur Museum.

76. Industrial Uses.—A small industry in rock-crystal of different colours called "Vallam stone" is carried on at Trichinopoly and in the Palladam taluk of the Coimbatore district of the Madras Presidency, the stones being brought from Vallam in Tanjore. Spectacles and dolls are made out of them. The "Godavari pebbles," which were formerly eagerly sought after, are not now in demand, being most probably out of fashion.

The most important industry in quartz or rather CORNELIAN (*Sang-i-dkik*, Hind.), etc., is that which for centuries has existed in the Bombay Presidency, more especially at Cambay; the stones are brought from Rajkot and Rajpipla. Broach is also another centre for this industry. Less important centres of lapidary work are those of Jabalpur and Banda.

XII. RUBY (*Lal, Manik, Hind.*), SAPPHIRE (*Nilam, Hind.*), and SPINEL.

RUBY.

77. Occurrence.—The chief Ruby Mines of Upper Burma are situated in the neighbourhood of Mogok and Kyatpyin, in the Ruby Mines district, and are worked by the Burma Ruby Mines Company and by native workers. These mines give employment to some 218 persons.

SPINELS and SAPPHIRES are not intentionally worked for, but are often obtained in association with the Rubies. In the Ruby Mines district, Rubies, Spinels, Catseyes, Sapphires, and inferior precious stones are found throughout the Mogaung township, near the villages of Wapyudaung, Kyaukgyi, and Yingan in the eastern and hilly portion of the Twinnge township, also near Sagadaung and Udintaung in the Momeik State. The principal ruby-bearing region, *i.e.*, that of Mogok and Kyatpyin, extends over an area of 66 square miles, but the tract in which the Ruby mines are now actually worked is about 45 square miles in extent. The mines are situated in a mountainous tract some 90 miles north-west of Mandalay, and 50 miles by road east of Thabeikkyin on the Irrawaddy, at an elevation of 5,000 feet above the sea. The stones occur in small patches in the valleys or between the fissures of the rock, or on the surface soil of the hillsides.

Another ruby tract is that known as the Sagyin Ruby Mines, *Mandalay*. These are situated in a narrow range of hills rising from the plain of the Irrawaddy valley, 24 miles north of Mandalay, and 8 miles from Madaya. These mines are at present reserved by Government and are not being worked. So again Rubies are found in Bhamo in the Nanyaseik stone tract; but the extent of occurrence is not known. The production in 1894 is said to have been 26 tolas valued at R6,750.

In India itself certain tracts of country are said to contain rubies such as in the Salem district. The Collector of that district says, however, that garnets are often mistaken for rubies, and that, if there be rubies at all, they are not true rubies, but spinels.

78. Mining and Washing.—In the Ruby Mines district the stones are obtained by sinking pits through the superficial soil, until the stone-bearing stratum (*byôn*) is reached. This occurs at depths varying from 3 to 20 feet. The earth obtained from these pits is washed through sieves and the stones separated.

The earth from between fissures of rock is similarly treated except that of course pits are not required. The earth is simply dug out of the crevices and washed.

The hillside deposits are worked by washing away the surface soil by means of streams of water diverted for that purpose. The stones are then obtained from the surrounding soil by the usual method of washing.

Another process of securing the rubies, and the one which is now principally employed by the Ruby Mines Company, is that of tunnelling into hills, in order to reach the fissures containing *byôn*. The *byôn* is dug out, conveyed to a washing station, and the rubies separated.

79. Outturn.—It may easily be understood that it must be more difficult to secure remunerative supplies of the stones now-a-days than in former years, since the more accessible deposits have been exhausted. It has been affirmed, however, that, even now, at least 10 lakhs of rupees worth of stones are obtained annually at the Burmese mines. The revenue of the Ruby Mines under the Burmese Kings is said to have been about £12,000 to £15,000 a year.

Recent returns are not forthcoming regarding the traffic in Sapphires. It is stated that in 1889 these stones to the value of R15,000 were derived from Kashmir.

REFERENCES.—*Records, Geological Survey of India, Vol. XXIII, Pt. 2 (1890), pp. 59—69; Vol. XXIV, Pt. 2 (1891), pp. 119—128; Report on Corundum Localities of Salem by C. S. Middlemiss of the Geological Survey.*

MISCELLANEOUS MINERALS.

XIII. ALUM (*Phitkari, Hind.*)

ALUM.

80. Occurrence.—Alum shales occur in several parts of India, but are more particularly worked at Madh in Cutch, at Kalabag and Kutki in the Panjab, and in Behar. In the Shikarpur district, alum is said to be manufactured on the Kirthar range in large quantities and of fair quality. In 1867 the yearly outturn of Gutch alum was estimated at 294 tons, but after that time it fell off. About 44 tons of alum are made annually at Kalabag, and 367 tons at Kutki.

Alum is also found in the Ye-u district of Upper Burma, near Udaung in the Indaing township, but it is not worked.

81. Trade.—Alum is extensively employed as a mordant in dyeing throughout India, but particulars of the extent of the traffic are not procurable.

XIV. ANTIMONY (*Surma, Hind.*)

ANTIMONY.

82. Occurrence.—Good lodes of Stibnite occur at Shigri in Lahoul and also in the Jhelum district of the Panjab. The Jhelum mines are annually leased by the District Forest Officer. There

is also said to be one mine in Rewa in Central India. Antimony is met with in the Ye-u district of Upper Burma near Udaung in the Indaing township, but it is not worked. But perhaps the most hopeful deposits of Antimony are those found in the Kyaukkaung tract of Tenasserim. On May 8th, 1894, Mr. J H. Herrifield submitted a report on these Tenasserim deposits. "The Kyaukkaung, he says, is divided into two unequal portions of approximately 250 and 370 square miles, respectively. Of these, the smaller western portion belongs to us; the larger eastern to the Siamese." "Mr. Adam, who in Antimony is an acknowledged expert, states that he considers the deposit within British territory as of immense value. He was originally brought out from Scotland by the Borneo Company to work their Antimony deposits in Northern Borneo." "I understand from him that the Stibnite (the commercial ore of antimony) here, as in Borneo, occurs in irregular deposits of a 'pocketty' nature, often massive and of great value, lining and filling fissures in the limestone in immediate junction with the newer states that overlie the limestone. The method of working is fossicking and poking about in likely localities till a run of payable ore is found and blasting out the pockets usually in open-casts. Rarely, and then only in the very richest ground, is sinking or driving on any scale attempted," "It is considered cheaper to smelt on the spot and to ship the crude regulus (unrefined pig), the necessary plant can be erected at small cost." *ANTIMONY.*

83. Economic Uses.—"The principal commercial use of Antimony is in the manufacture of type-metal, for which the demand is enormous and steady; the market is consequently fairly regular and is not subject to the violent fluctuations that have so baneful an effect on tin and other fluctuating staples. Antimony also enters into the manufacture of gong-metal, speculum-metal, certain classes of gun-metal, bell-metal and bronze-alloys."

XV. ASBESTOS "*Shankha palita, Mar.* (literally wick made of shells)".

84. Occurrence.—There is no recognised industry in collecting and utilising Indian Asbestos. The mineral is reported to occur in Afghanistan, the Panjab, Garhwal, Bhopawar (in Central India), in Chutia Nagpur and in Mysore. Last year (1894) 5 maunds, valued at ₹40, were procured from Hassan in Mysore. *ASBESTOS.*

XVI. BORAX (*Suha'ga', Hind.*)

85. Occurrence.—This mineral occurs on the margins of certain lakes in Thibet itself or just within the Panjab frontier of Thibet and in Jummu. In 1855 an attempt was made to develop the trade in native borax. At that time England's imports were 1,100 tons, of which, owing to a monopoly that existed in the trade, only 300 to 600 tons were produced in India. An inquiry was then set on foot which, although resulting in many interesting facts on the subject being made known, was not successful in materially improving the trade. *BORAX.*

1ST. PUGÁ BORAX.—The Pugá borax is obtained from the small valley of that name. The valley was visited by Captain W. C. Hay, who estimated the entire produce at 20,000 *kutcha* maunds (1 *kutcha* maund =32lb). Most of it goes *viâ* Rámpúr to the lower hills about Subáthua, Bhaji, etc., where in winter it is refined by the carriers, and thus becomes the borax of commerce. At Jagadri in the plains there are extensive refineries that receive nearly all the Pugá borax. The article is then carried down the rivers Jumna and Ganges, but it is doubtful if it reaches England in any quantity. Borax of a superior quality in fact nearly pure is found near Rudokh,—a portion of Thibet subject to China. It is also believed that if the jealousy of the sellers could be broken down, other borax-yielding districts would be discovered.

2ND. THE REGION OF INDIAN BORAX may be said to commence in the west, at the valley of Pugá in Ladak, passing east to the lakes of Rudokh. Along this tract of country and extending considerably to the east, a chain of salt lakes occurs, most of which in all probability afford borax. To the south of Lhasa, at the Yamdok Cho, borax is known to have been collected from time immemorial. Holes are dug in the arid soil of many parts of the deserts of Tartary, wherein native borax collects, and is periodically gathered.

The process of purification has been described thus:—

Purification of Borax.—"The borax is pounded and placed in shallow tubes, and then covered with water to the extent of a few inches; to this is added a solution of about two pounds of lime (dissolved in two parts of water) for every ten maunds (820 pounds) of borax, and the whole mass is well stirred every six hours. Next day it is drained on sieves or cloth and after this is again dissolved in 2½ times its weight of boiling water, and about sixteen pounds of lime added for the above quantity. It is then filtered, evaporation takes place, and subsequently it is crystallized in funnel-shaped vessels, usually of *kansa*, an alloy of copper and zinc or lead. The loss in weight is about 20 per cent."

86. Trade in Borax.—Borax is chiefly imported into India through the North-West and the Panjab Himálaya. The following statement shews the principal *Imports* for the years 1883-84 and 1893-94:—

Imports from Thibet into the North-West Provinces.

Years.	Weight in Cwt.	₹
1883-84	24,873	337,938
1893-94	14,850	157,548

BORAX.

Imports from Ladak and Thibet into the Panjab.

Years.		Weight in Cwt.	R
1883-84	Ladak	6,676	73,081
	Thibet	2,452	20,028
	TOTAL	9,129	93,109
1893-94	Ladak	1,148	10,588
	Thibet	968	7,908
	TOTAL	2,116	18,496

Exports.—In India the trade in Borax judging by the returns available may be said to be decreasing; the figures returned of the exports of this article to foreign countries also show a marked decline. But the decline may be taken as a natural consequence of the discovery of extensive beds of borax in America, and of the greatly extended trade in the artificially prepared article. It has been thought that although India cannot hope to compete in the foreign trade her trans-frontier imports will always be of importance, owing to the considerable internal consumption.

Analysis of the Foreign Export Trade in Borax for 1893-94 as compared with that for 1883-84.

Province from which exported,	1883-84.		1893-94.		Country to which exported,	1883-84.		1893-94.	
	Cwt.	R	Cwt.	R		Cwt.	R	Cwt.	R
Bengal	16,095	3,54,699	7,017	1,20,323	United Kingdom	14,134	2,92,585	4,595	74,616
Bombay	121	3,819	213	5,148	Arabia	38	1,130	26	667
					Hong kong	1,713	56,424	2,086	40,171
					Straits Settlements	258	6,147	319	5,375
					Turkey in Asia	36	1,057	152	3,666
					Other Countries	37	1,175	52	973
TOTAL	19,216	3,58,518	7,230	1,25,471	TOTAL	16,216	3,58,518	7,230	1,25,471

XVII. COPPER ORES (*Támba Támá, Hind.*)

COPPER.

87. Occurrence.—These ores are widely distributed. They occur in Singhbhum and Dalbhum, and are said to be found also in the Banka division of the Bhagalpur district, Bengal; but mines in the latter locality do not appear to have ever been opened. Azurite and other carbonates of copper are found at Kakwara in South Bhagalpur.

Copper ores occur in several places in the Chanda district of the Central Provinces, and there are at least three places in the Mul tahsil, where mines were worked in ancient times. These ores are also found near Birman in the Narsinghpur district and Gosalpur and Khetola in the Jabalpur district, but in the latter place it has not been worked as an industry.

In Rajputana, copper ores are found in several of the independent states, and in the British district of Ajmere, where mining was practised on a large scale, but is now almost extinct. There is said to be one copper mine in Rewa State, Central India.

Unsuccessful attempts have been made to work the copper ores of Kumaon, Garhwal, the Western Duars, and the Darjeeling districts.

Copper mines are said to exist in Hyderabad, but valuable ores in any quantity have not as yet been discovered.

In Burma, copper ores are believed to exist in the hills east of Kyannhyat, Ruby Mines district; and Messrs. Hegt & Co. have recently applied for a license to prospect in that locality.

88. Outturn.—Statistics regarding production of copper in 1894 are not available. The outturn in Bengal during the year 1891 was estimated at 2,500 tons, valued at R1,32,500. In 1888, 218 tons of refined copper were said to have been turned out.

The industry of copper smelting has been dormant in India for many years, and in fact has only revived to any extent in two localities in Bengal, *viz.*, Baragunda in Singhbhum and in Dalbhum, where a company is said to be working the ore.

XVIII. CORUNDUM (*Kurund, Hind.*)

CORUNDUM.

89. Occurrence.—Corundum and Emery stone (Oxide of Aluminium) is very freely distributed among the crystalline rocks of Southern India, such as in the Travancore State, the Mysore State,

Hyderabad (Kazipet), and in the districts of Coimbatore, Salem, Anantapur, North Arcot, and South Canara of the Madras Presidency. A report recently published by Mr. C. S. Middlemiss of the Geological Survey on the Corundum localities of Salem will be found very instructive. ***CORUNDUM.***

90. Outturn.—The mines in Salem and South Canara are not worked, though they may be said to have great possibilities. Three tons are reported to have been quarried during 1894 in the Madras Presidency. An immense deposit exists near Pipra and Kodopani in South Rewa. This is said to have last year realized ₹547.

In Anantapur the industry is reported to be active during the rainy season, especially in one taluk. In Coimbatore and North Arcot the right of collecting has been leased out for ₹1,625 per annum and for ₹2·4 per Indian maund, respectively, from the year 1893. In the Mysore State leases are sold by public auction.

The estimates of Mysore production during 1894 were—

	Quantity.	Value.
	Cwt.	₹
Mangalore	Not ascertained	402
Kolar	42	15
Tumkur	713	2,708
Hassan	111	318
Chitaldrug	2	10
	868*	3,453

91. Aluminium Preparation by Electricity.—The following passage, reprinted from the *Englishman* of October 30, 1895, may be here given :—"In connection with the Periyar project lately inaugurated in Madras, it has been proposed to utilise the energy of the water rushing through the tunnel in order to produce electricity, and then to use this electricity to prepare ***Aluminium*** from corundum (oxide of aluminium). There are said to be large deposits of corundum not far from the tunnel. The distance may be about 100 miles; but the electricity can be carried along wires to the corundum deposits. Aluminium is supposed to have a great future before it."

92. Uses.—"The uses to which corundum is put, when powdered, are well known. The consumption in India must be considerable, though possibly it was larger formerly than it is at present, as the trade of the native armourer is perhaps not so active as it used to be. A large quantity is employed by the cutters and polishers of stones, both precious and ornamental, who are to be found scattered throughout India. To what extent Indian corundum is used in European countries is not very well known, but it could doubtless be applied to many of the purposes for which the emery of the Greek islands is now used, and which, owing to a monopoly at one time, reached the high price of ₹30 a ton in London." (Mr. Mallet in *Manual of Geology of India, Part III, page 422, IV.*)

XIX. GYPSUM (*Kulnar; Kharyā mitti, Gach, Hind.*)

93. Occurrence.—Gypsum occurs in the following localities :— (1) Trichinopoly, Madras; (2) Cutch and the Kirtha range of Sind, Bombay Presidency; (3) near Nagore in the Jodhpur State, Rajputana; (4) Central India; (5) Bannu, Kohat, and the Salt Range near Kalka, Panjab; (6) Kumaon and Garhwal, North-Western Provinces. ***GYPSUM.***

The mines in the Trichinopoly district are not worked; and the quality of the gypsum found in the neighbourhood of Nagore is not good as a general rule, but in the excavation of a well in the Falodi pargana some of the finest specimens were found; but they were at too great a depth to be workable. The mines in the neighbourhood of Nagore are worked in the following manner :—

Depressions where the gypsum is found are cleared of the surface sand and earth, and trenches are dug, from which it is removed in the form of clods. The trenches being left untouched for two or three years and exposed to rain, fill up with gypsum, which is again removed. It is used generally as a cement, where it is not much exposed to atmospheric changes. The cement is prepared by burning. At present little gypsum is extracted, but better results are now hoped for since the opening of the railway to Nagore, which will cheapen the carriage.

94. Outturn.—The production in the Rajputana States during 1894 is estimated at 3,169 tons, valued at ₹2,034. In Bundelkhand last year's production came to 118 tons.

Gypsum is not much utilised in India, though in many of the above-mentioned localities it may be had of good quality. In Bombay it sells at about ₹2 per hundredweight. It is a valuable manure, especially for leguminous crops, in the ash of which it is an important constituent.

REFERENCES.—*Records, Geological Survey of India, Vol. XXII (1889), pp. 137—139.*

XX. LEAD ORES (*Sisa, Hind.*)

95. Occurrence.—Extensive old workings occur at Guzalpali in the Kurnool district of Madras, but the mines are not worked at present. In the Bombay Presidency lead ores are found in the Panch Mahals and Narakot (Rewakantha) near the iron ores. ***LEAD.***

BENGAL.—In Bengal deposits of galena are met with in the Bhagulpur district, and have been more or less worked at various times. Others are found at Dhadka in Manbhum; in the Monghyr district lead ore is met with in the stream beds of the Kharakpur hills near Gungta in the estate of the Maharaja of Darbhanga. This ore resembles *kankar* (see page 30) in appearance, the outer surface being carbonated, and it evidently has its origin from a bed or vein of sulphide, which has not, however, been searched for and located. Some years ago a European gentleman entered into an agreement with the proprietor of the Lachmipur estates in the Banka sub-division of the Bhagalpur District, Bengal, and commenced mining operations, but very soon discontinued his explorations.

CENTRAL PROVINCES.—In the Central Provinces lead ores have been found in the Sambalpur and Raipur districts.

* This total involves an error through the yield of Mangalore not having been returned.

LEAD.

PANJAB.—Lead mines and works were started many years ago near Subathu in the Simla district, and mines have for long been worked by natives in Sirmur.

RAJPUTANA.—Galena has been extracted in Ajmér, Alwar, and Udaipur, etc.

BURMA.—There are old lead mines in the Mandalay and Katha districts of Upper Burma, but they are not now worked. A mine in Bawzaing, Southern Shan States, is, however, worked by a Chinaman to whom a five years' lease of 4½ square miles has been granted.

Lead mining in India may, therefore, be said to be at present practically in a dormant condition.

XXI. MAGNESIA MINERALS (*Zahr mohra; fulzát, Hind.*)

MAGNESIA.

96. The very extensive occurrence of magnesite in the chalk hills close to Salem, in the Madras Presidency, is noteworthy, but this valuable supply is not at present utilized. The reader should consult the Report recently issued by Mr. C. S. Middlemiss of the Geological Survey.

Veins of this mineral are also met with in Arakan and in Manipur, as also traces near Mussoorie. Near the Happy Valley in the latter district, three out-crops, four feet thick, a mixture of fine white powder and of coarser rock have been discovered. Twenty per cent. of the coarse rock obtained contained nearly equal quantities of magnesium carbonate and calcium carbonate. The white powder amounted to 80 per cent., and by analysis was found to be composed as follows :— Silica, etc., 6; Alumina ferric oxide, etc., 3; Calcium carbonate, 7; Magnesium carbonate, 84; Total 100.

XXII. MANGANESE ORES (*Kolsa-ka-pathar, Hind.*)

MANGANESE.

97. **Occurrence.**—Manganese deposits exist along the East Coast Railway in the Vizianagram State, Vizagapatam district, and are found in large quantities in the Chipurupalle taluk of that estate. They are chiefly found in "pockets," close to the surface, and are reported to be of good quality.

His Highness the Maharajah of Vizianagram has commenced to work them, and some experimental shipments are reported to have lately been made to England.

Manganese ores are found also in the trap rock in Belgaum, Dharwar, and Ratnagiri districts of the Bombay Presidency. Jhabua in Central India is also said to possess valuable supplies of this mineral, which are not as yet employed industrially. But the most famous and perhaps the most hopeful locality for future development is Gosalpur in the Jabalpur district of the Central Provinces. A lease has recently been granted of these mines to a European firm.

An extensive bed of ore—thought to be of several square miles in extent—has been reported to occur in Lower Burma. It unites three localities: the bank of the Thugoo stream, the bank of the Thirabuen, and the Great Tenasserim river. The ores are stated to consist of black and grey oxides and wad.

98. **Outturn.**—Eleven thousand four hundred and ten tons were produced during the year in the Madras Presidency.

REFERENCES.—*Records, Geological Survey of India, Vol. XXI, Pt. 3 (1888), pp. 71—89; XXII, Pt. 4 (1889), pp. 216—226.*

XXIII. MICA (*Abrak, Hind.*)

MICA.

99. **Occurrence.**—Commercially Mica is sometimes spoken of in India as TALC though mica and talc are different minerals. The former is elastic and cleavable into sheets, the latter flexible and seldom in sheets or scales. The main region of Mica production is in the Hazaribagh district of Bengal, where the mines in the Koderma Government estates and in the Gadis-Gawan are being utilised. It is also found in the Gya, Monghyr, and Bhagalpur districts of the same province, but only two mines, *viz.*, one at Sapahi and one at Singar in the Gya district, are now worked.

Mica also occurs in the Nellore and Coimbatore districts of the Madras Presidency, but the mines in the latter district are not worked, as the industry is not sufficiently remunerative. The mines in the Nellore district have been favourably reported on by Dr. Warth.

Mica is found in the Shabhabunda taluk of the Karachi district of Sind, in the Kishengarh State of Rajputana, and near Jambagaun, 20 miles west of Chota Udaipur in Rewakantha. The Kishengarh Mica is said to be not very pure, and to occur in pieces not large enough for trade.

The Hyderabad mines have been considerably worked by the Hyderabad (Deccan) Company, but the variety of Mica chiefly met with is biolite, and is generally so largely impregnated with iron as to be of inferior commercial value.

Mica also occurs in the Mysore State as well as in Burma. In the latter province the mineral is met with in the Ruby Mines district, near Chaukkyi in the Twinngé township, and in various parts of Mogôk township.

100. **Outturn.**—The estimated production during 1894 was 175 tons, valued at ₹1,45,208, in Bengal, the major portion being derived from Hazaribagh. Mysore produced 2¼ tons, valued at ₹180. Three tons were raised in the Madras Presidency, the value of which is not stated. The total number of persons employed on Mica mines has been returned at 1,882, but a good few of these are only in temporary employment.

101. **Prospects.**—The method of working is not the same in all the Mica-producing districts. For instance, in Gya the mines are worked by manual labour and blasting. In Monghyr quarries are formed by means of iron bars and the rocks are sometimes blasted by dynamite, and the strata of Mica thus removed. Where the surface gives indications of Mica, pits are frequently sunk. In Hazaribagh, the mines are worked in the native fashion by means of pits, and no European machinery or contrivances are resorted to.

Judging from the returns of output, the industry could not be said to be in a very flourishing condition in Bengal, still less so in the Nellore district of the Madras Presidency. Indeed, in the latter locality most of the workings have proved unsuccessful, and many persons who have obtained leases to work the mineral have had them cancelled. But the returns of trade conflict with the

published statements of production. The exports would seem to show that a more healthy state of affairs exists than is borne out by the figures as officially returned. In fact a comparison of the returns of production and of the exports leads almost irresistibly to the conclusion that some error is involved in the returns of production, which should accordingly be received with caution. *MICA.*

Exports of Mica from India and the Countries to which exported.

Provinces from which exported.	1889-90.		1890-91.		1891-92.		1892-93.		1893-94.	
	Cwt.	₹	Cwt.	₹	Cwt.	₹	Cwt.	₹	Cwt.	₹
Bengal	2,579	5,58,588	6,351	9,12,450	2,298	4,28,393	3,310	4,33,772	4,843	7,65,879
Bombay	...	...	33	575	27	314	18	511	5	120
Burma	...	...	...	...	...	...	1	65	6	700
TOTAL .	2,579	5,58,588	6,384	9,13,025	2,325	4,28,707	3,329	4,34,348	4,854	7,66,699

Countries to which exported.	1889-90.		1890-91.		1891-92.		1892-93.		1893-94.	
	Cwt.	₹	Cwt.	₹	Cwt.	₹	Cwt.	₹	Cwt.	₹
United Kingdom . . .	1,813	3,32,651	3,248	4,48,864	819	1,18,932	1,388	2,40,952	2,598	5,28,514
France	...		8	785	10	1,340	...	...	26	8,150
Germany	51	7,596	170	34,363	73	17,425	5	764	169	33,518
Egypt	...	...	...	...	12	120	...	...	...	...
Mauritius	1	25	...	...	...	...	...	...	...	...
Austria	...	...	...	...	...	...	100	236	...	...
United States . . .	714	2,18,316	2,947	4,28,878	1,401	2,90,806	1,834	1,92,380	2,061	1,96,517
Arabia	...	...	...	...	10	84	...	...	...	...
Straits Settlements . .	...	...	11	135	...	...	...	...	...	...
Natal	...	...	...	...	...	...	2	16	...	...
TOTAL .	2,579	5,58,588	6,384	9,13,025	2,325	4,28,707	3,329	4,34,348	4,854	7,66,999

REFERENCES.—*Commercial Hand-books (Imperial Institute Series) No. 19 of 1893; Records, Geological Survey of India, Vol. XXI, Pt. 4 (1888), pp. 163—165.*

XXIV. PLUMBAGO (*Sisa, Hind.*)

102. Occurrence.—The localities where Plumbago (Graphite) has perhaps been found most abundantly in India are in the Madras Presidency, especially in Travancore, where the mineral is of better quality than elsewhere, although apparently inferior to that worked in Ceylon. In Travancore the mineral is found in Vallanad in the Neduvengad taluk. It is worked by sinking shafts in the veins and sloping away intermediate blocks of vein, which are subsequently filled up with rubble from the surface. A poor quality of graphite occurs in the Vizagapatam district. An announcement of recent discoveries of Plumbago in the Godaveri district has appeared in the local press, but nothing is known officially regarding these. *PLUMBAGO.*

In Bengal it is found at Kakwara in South Bhagulpur, and is said to be met with in the Banka sub-division of the same district. The search made at Kakwara to find larger deposits has not been successful. Plumbago has been found to occur in a considerable bed at a place called Mulkanoor in Hyderabad.

Masses of several pounds' weight, much mixed with earthy matters, have been met with in places wide apart, but no vein or shoot of any extent has been discovered.

103. Outturn.—The quantity produced in 1894, at Travancore, was 1,597 tons, the value of which is not stated. Regular mining is carried on, but the industry is depressed through the inferior quality of the mineral, though it is available in abundance.

XXV. SOAPSTONE (*Abrak, Hind.*), STEATITE or MASSIVE TALC.

104. Occurrence.—The common coarse variety of this mineral is known as Potstone. *SOAP STONE.*

MADRAS.—The finer forms of the rock, for which there is a demand in England, are not very extensively met with in India; the best occurs near Betumcherla in the Kurnool district of the Madras

SOAPSTONE. Presidency. Following that, the soapstones of Anantapur, Bellary, Cuddapah, Salem, Malabar, Nellore, and South Kanara districts may be mentioned. There is no established industry in the soapstone of Anantapur and Kurnool, the mineral-bearing localities being, in fact, included in the forest reserves. The stone has been worked for several years, however, under forest permits in Sydapuram village of the Nellore district, where the yield is said to be inexhaustible. The excavation of the stone constitutes the only source of living to a large number of families in the village where it occurs. Some speculators applied for mining rights under the lease system, but in consideration of the stone affording a living to the villagers, the permit system has been kept in force.

Vessels made of this stone are exported to other districts. But the trade in Bellary has not been flourishing, as there is not much demand for these articles.

In two villages of Cuddapah, quarrying of soapstone is carried on on a somewhat large scale. The stone is found on the sides of hills at a small depth from the surface and is dug out by means of crowbars. The working season is between January and July, and two to sixteen cart-loads of 33 maunds each are quarried in the course of a month. The stones are used for polishing the walls of buildings, and are chiefly sent to Madras, where there is a great demand for this kind of work. Specially prepared pieces are also employed as pencils for writing on slates.

In Salem potstone is excavated and chiselled into culinary utensils of various sizes by professional workers, and these vessels are exported to different districts. There is a regular industry in these commodities. The quantity produced during 1891-92 was 321 tons. Separate returns for 1894 are not available.

Bombay.—The stone in Malabar is said to be very gritty. It is found in the Dharwar, Belgaum, Kolhapur, Ratnagiri, and Kanara districts of the Bombay Presidency.

Bengal and North-Western Provinces.—In Bengal soapstone is met with in the Manbhum district. It is also found in the Jhansi district of the North-Western Provinces, at Hamipur and the Lalitpur sub-division. The total production in 1894 has been estimated at 92 tons. The stone is obtained from open workings and is made into cups, images, and the like. The industry, however, is of very trifling character.

Central India, etc.—The marble rocks in the Jabalpur district and Kanheri in the Bhandara district of the Central Provinces give capital stone. In fact the next best localities are in the Jaipur State of Rajputana. The mineral also occurs in the Bundelkhand States of the Central India Agency.

Burma.—There are mines for soapstone in the Prome, Pakokku, Katha, Bhamo, Kyukpyu, and Minbu districts of Burma. On the hills round Prome it lies about a foot and-a-half below the surface. The Minbu quarries and those in Kyaukpyu district are all in a group on the borders of Arakan and Upper Burma. The steatite occurs in veins of 6 inches to a foot thick. In the Bhamo district soapstone is met with to the north and north-east of the Jade and Amber mines, and in another distant locality far up the Irrawaddy. Several of the Minbu quarries are annually leased to Burmans, the leases being disposed of by auction. In some cases, besides a lump sum down, a royalty on the outturn varying from 10 to 20 per cent. is reserved to Government.

105. Outturn.—The Burmese (Minbu) production in 1894 was 16 tons, valued at R12,500. During the year the outturn in Hyderabad was valued at R117. Particulars as to quantity are not available. The soapstone produced in the Mysore State in 1894 is estimated at 597 tons, value R2,252, and that produced in the Madras Presidency at 58 tons. The value of the outturn in Bundelkhand, Central India, for 1894 is estimated at R2,025. Figures showing total quantity produced are not given. The total number of persons employed at Steatite mines (permanently and temporarily) have been returned at 200.

Conf. with Imperial Institute Hand-book No. 27 of 1893; Records, Geological Survey, Vol. XXII, Pt. 2 (1889), pp. 59—68; Vol. XXIII, Pt. 3 (1890), pp. 124—130.

XXVI. TIN ORES (*Rang, Kallai, Hind.*)

TIN ORES. **106. Occurrence.**—These are only known as yet to occur in any very promising quantity in Maliwun sub-division of the Mergui district of Lower Burma, where the mines form a portion of the great stanniferous belt stretching along the granite backbone of the Malay peninsula with scarcely an interruption.

In the Mergui district they stretch continuously from the Siamese frontier along the whole seaboard to at least the latitude of Tavoy, beyond which the great gigantic axials disappear below the greater overlying deposits of more recent stratified rocks sweeping southward. The interior is but little known; and it seems that the heaviest out-crops of the granite, with which the tin is associated, are the more plentiful towards the coast.

Judging, however, from the fact that heavy tin is worked on a commercial scale at Thibawleik in the Tenasserim valley, and that tin is found in the Siamese States of Bantaphan, of Chomphom, and Faungswan, along the Gulf of Siam, it is hoped that the main watershed may be found to throw off spurs of stanniferous granite at least as valuable as the out-crops in the secondary axials along the coast. In the Maliwun sub-division there are four main centres at which tin is worked, though these form practically the four earliest points of attack along a more or less continuous stanniferous belt running for 200 miles north and south with a mean width of perhaps 20 miles.

The main points give their names to the four principal fields:—

(1) Maliwun.
(2) Karathuni, Banhuni.
(3) Bokpyin.
(4) Migyaungchaung, Yayugon.

In these and all other fields the tin occurs in more on less imperfect fissure lodes, frequently shattered and distorted by more recent movements, which (as at Maliwun and Renaung) are not unseldom accompanied by silicious hot springs, probably rising on lines of *fault* through which the tin has risen from below, occasionally permeating the metamorphic rock through which the granite has been upheaved.

The lodes, except Khowmaung near Maliwun, where a few Chinese have been for some time picking at the out-crop with crowbars, are not worked commercially; specimens of heavy tin ores

received from Hangpon, Bokpyin, Sadein, and Thibawleik prove these lodes to be widely distributed. The alluvial tin has been derived from these lodes by the gradual denudation of the hills containing them, and is now deposited in the form of a more or less coarse sand mingling with the gravels and other alluvial deposits in the river valleys and gentle slopes at the foot of the granitic hills.

In these the working is carried on by a simple process of alluvial working, ranging from the rude methods of the "Tampan" (= hill, a Chinese word) worker, who contents himself with "fossicking" in the narrow hill valleys, to the larger open mines on the plains, where immense gravel pits are opened, and the Karang (or pay dirt) is raised from depths of sometimes as much as 30 feet. This Karang contains the tin oxide, which is separated from it by working. The ore is then smelted with charcoal in a small open blast furnace of the pattern known as the *Pon-kah* furnace.

107. Outturn.—The total output in 1894 was 98 tons, valued at R1,08,700, of which 81½ tons were exported, valued at R89,650. The balance, 16½ tons, were stock kept for export in 1895, the market having fallen towards the end of the year.

The industry, which has been for many years in a depressed condition, is reviving. It is difficult to say how many persons are actually employed in this industry since the bulk of the extra hands employed in the rains are as much fishermen or agriculturists as miners. The returns show for 1893-94 that 407 persons were permanently employed, and 205 temporarily. The number of miners solely employed as such is, however, rapidly and satisfactorily increasing. A great stimulus has been given to the tin industry by the grant of a lease to Captain Menzell of Singapore. The lease was granted in March 1893 and conveyed to the Captain exclusive rights for five years of mining for tin in the Maliwun township, except in areas occupied by native miners. On the expiry of this period a lease for 21 years will be granted to Captain Menzell if he has worked his five years' concession in a satisfactory manner.

Captain Menzell has begun operations by importing a number of Chinese miners from the Straits Settlements, and he hopes to increase the number of miners and develop his concession rapidly.

108. Trade.—The trade in tin consists for the most part of imports from foreign countries. During the past five years these have averaged 40,832 cwt., valued at R29,01,581. The imports in 1893-94 and the countries from which these supplies were drawn are shown by the following table :—

Imports of Tin, 1893-94.

Countries whence Imported.	Quantities.	Value.	Share taken by each Province.		
			Province.	Quantit	Value.
	Cwt.	R		Cwt.	R
United Kingdom . . .	1,572	1,13,889	Bengal	25,386	18,20,208
Ceylon	83	4,414	Bombay	14,931	10,74,410
China—Hongkong . . .	37	2,834	Sindh	1	100
Straits Settlements . . .	44,208	31,54,004	Madras	4,663	3,14,242
Other Countries . . .	6	576	Burma	925	66,757
TOTAL . . .	45,906	32,75,717	TOTAL . .	45,906	32,75,717

REFERENCES—*Records, Geological Survey of India, Vol. XXII, Pt. 3 (1889), pp. 188—208.*

XXVII. MINERAL PAINT AND OCHRE (*Geru, Hind.*)

109. Occurrence.—Mineral paint of a slatish colour is found in a vein technically termed a "fault" commencing from the northern extremity of the Kishengarh hill in Rajputana and extending, at least so far as has been hitherto ascertained, for several miles in the north-easterly direction.

It has been found to be a good substance for painting wagons, iron work, iron bridges, etc., and the sides of ships.

As it has been found by an analysis in the Geological Survey Department of the Government of India to contain very little iron, and the iron being in the state of peroxide, there is no further room, it is stated, left for oxidation or rusting. Samples have been sent out to various places both in England and India, but no market has been created for it. It has, however, been approved by the Rajputana-Malwa Railway, for whom a small paint-manufacturing machine has also been erected at their workshops for making paint of the mineral.

110. Ochre.—Found in parts of the Meywar State, Rajputana. In 1894, three and-a half tons were obtained, valued at R5. In Hyderabad, Deccan, red ochre is met with. The quantity produced in 1894 was valued at R28. Red ochre is also found at Baraundha in Bundelkhand, Central India Agency, where the outturn in 1894 was estimated at 13 tons, value R62. Figures showing quantity for all India are not available.

XXVIII. FULLER'S EARTH (*sabún-mitti, Multani-mitti, Hind.*)

111. Occurrence.—As regards the distribution of Fuller's Earth in India, information is very incomplete. It is known, however, to be carried for long distances from certain localities where it

FULLER'S EARTH.

occurs in the Bhagulpore Division of Bengal; in the neighbourhood of Colgong, a soap-earth is obtained. In Rajputana a fuller's earth used to be procured from fissures in quartz and schistose rocks. In some parts of Western Sind a pale-greenish clay is found which is used for washing cloth, etc. In the Panjab, in Dera Ghazi Khan and Multan districts, a clay resembling fuller's earth is imported from the interior of the Suleman Range and conveyed all over India under the name of *Multani-mitti*. At Nilawan, in the Salt Range, a lavender-coloured clay or decomposed rock is employed by the natives as a fuller's-earth. The returns of production of fuller's earth during the year 1894 refer to Bhartpur and Bikanír in Rajputana. The outturn in the former State during 1894 was estimated at 539 tons, value R466. The quarry at Meth in Bikanír is 36,000 feet long, 18,000 feet wide, and 8 feet deep. It has been in existence a long time and will last for an indefinite period. The quarry is worked by pick-axes.

The quantity excavated annually is not fixed, but varies according to demand. About 2,000 camel loads are usually carried annually to Sirsa. Figures for 1894 are not available. The outturn during 1893, however, was 715 tons, valued at R3,000.

SOAPSAND is found in Burma in the Myingyan district. The production in 1894 was 190 tons.

These clays are used for cleaning hair, dyeing clothes and weighting paper.

XXIX.—SALTPETRE or NITRE (*Shorá, Hind.*)

SALTPETRE.

112. Occurrence.—The Saltpetre of Indian commerce is derived mainly from Behar (chiefly Tirhut, Saran, and Champáran), and to a very much less extent from the North-West Provinces (Cawnpore, Ghazipur, Allahabad, and Benares), with a small amount from the Panjab, Central India, Bombay, Madras (Coimbatore, Kistna, Trichinopoly, etc.), and from Burma.

Under the name of *Shórá*, it occurs as a natural efflorescence on the surface of the ground. It is in that condition mixed with several other salts, chiefly the Chlorides of Potassium and Sodium, Nitrate of Lime and Sulphate of Soda. The last-mentioned salt is, as a rule, the most abundant. But the saltpetre lies as it were in patches, some parts of the efflorescence being more productive than others, according as Carbonate of Lime and Sand predominate. For common salt prepared at saltpetre refineries see pages 3 and 4.

113. Refining.—The *loneahs* (or rather *núniahs*) or native manufacturers of saltpetre commence operations in November by scraping off the surface soil from waste ground, mud buildings, etc. This is then purified by solution and filtration, the principle involved in the purification being the varying rates of solubility of the salts at different temperatures. The next stage is to evaporate the saltpetre liquor to a crystallising state. This is generally accomplished from April to June. For this puspose the liquor is put into earthen pots fixed in two rows over an oblong trench dug in the ground. The interspaces between the pots are filled in with clay and an aperture left at the further end to allow of the escape of smoke, so that the contrivance becomes converted into a crude furnace. The fuel employed is generally the dry fallen leaves of the mango tree.

After evaporation has been carried to the crystallisation stage, the liquor is removed and the salt allowed to deposit on cooling. Glue is not employed in India to assist in the separation of the extractive matters.

114. Trade.—The trade in saltpetre is subject to extreme fluctuations which to a large extent are dependent on political considerations. It is as a rule a very profitable traffic to the native manufacturers, as may be inferred from the willingness of the moneyed classes to make advances on the prospective outturn. Within recent years, however, the demand has declined considerably.

The declared production of the larger refineries, as given in the Financial and Commercial Statistics for 1894, comes to 10,936 tons, but that amount is very possibly not much more than half the actual production. There are in India 1,459 refineries that give returns of their production, and these would seem to employ 8,328 persons, about half only of whom are permanently engaged.

The following table shows the exports of saltpetre from India during the past five years, the returns being grouped as to provinces from which exported and chief countries to which exported:—

Exports of Saltpetre from India and the Countries to which exported.

Provinces from which exported.	1889-90.	1890-91.	1891-92.	1892-93.	1893-94.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt
Bengal	418,925	398,287	386,366	438,468	320,438
Madras	282	209	89	46	6
Bombay	224	647	385	1,194	796
Sind	2,798	547	2,345	4,283	693
Burma	...	...	...	...	...
TOTAL .	422,229	399,690	389,185	443,931	321,933

Countries to which exported.	1889-90.	1890-91.	1891-92.	1892-93.	1893-94.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
United Kingdom	167,052	136,904	130,923	153,108	123,322
United States	90,981	132,304	116,172	142,830	65,340
Hongkong	76,872	82,350	78,632	83,864	63,115
France	34,949	5,971	10,185	6,876	8,751
Mauritius	21,400	24,908	30,552	31,345	33,437
Straits Settlements	17,929	7,625	11,285	12,881	14,811
Australia	895	1,707	1,462	530	601
All other Countries	12,151	7,921	9,974	12,497	12,556
TOTAL .	422,229	399,690	389,185	443,931	321,933

MANURE.—The value of Saltpetre as a manure will be found discussed in *The Agricultural Ledger*, No. 10 of 1893.

XXX. SODA SALTS (*Khari-nun, Hind.*) (Other than Common Salt.)

SODA SALTS.

115. Occurrence.—In very many districts of India Sulphate and Carbonate of Soda are manufactured from the surface soil or saline efflorescence, and the Carbonate is also prepared by incineration of certain plants known as saltworts.

The SULPHATE known as *Khari* or *Khari-nun* or *Chamra-khari* is prepared either by solar evaporation (*ābi*) or by the use of artificial heat (*jaria*). The salt known as *patna-khari* is a pure form of sulphate produced by first burning the efflorescence with alternate layers of rice straw, then lixiviating the calcined mass.

Sulphate of Soda, prepared by one or other of these methods, is an article of local trade in Behar, Fatehpur, Etah, Bulandshahr, Hurdui, Patiala, etc. It is chiefly used for hide curing.

The CARBONATE (*Sajji*) exists either as a natural mineral obtained from saline efflorescence or as BARILLA derived from the ashes of certain plants. To obtain the former, shallow basins are formed, about ten yards square. Into these beds water is admitted to a depth of two or three inches. The soda efflorescence of the neighbourhood is then thrown into the water until a thick pasty mass is produced. This is smoothed over and in a week's time a concentrated efflorescence forms on the surface. This is collected by the hand and is known as *papri-sajji*. To make *sajji* the *papri* is again dissolved and boiled in earthen vessels until the impure carbonate forms into a hard mass.

BARILLA is chiefly manufactured in the Panjab from various plants known generically as *lani*. These are burned in pits in successive relays until a sufficient amount of ash has been accumulated. The ash is then covered with a thin layer of earth to prevent loss by evaporation and is left to cool. After about a week the layer of ash in the bottom of each pit is found to be a hard mass of *sajji*.

BLACK SALT (*Kala-nun*) is an article of some importance in the local markets of India. It is prepared in Upper India chiefly at Bhewani in Hissar. Common salt is heated with the chebulic and emblic myrobalans together with *sajji*, until a sort of fusion takes place. The article so manufactured is used as a medicine.

Although a few of the provincial returns make mention of the soda salts, definite statistics have not been furnished. The above remarks have been thrown together partly to indicate the regions where these salts are obtainable, and partly in order to establish a position where in future Reviews mention may be made of the extent of the traffic in these minerals.

QUARRY STONES.

XXXI. CLAY (*Chikni-mitti, Hind.*)

CLAY.

116. Occurrence.—Brick, fire, and pottery clays are pretty generally distributed. The most valuable pottery clays occur in Jabalpur. Clay of a very fine character is also found in Raniganj, Bengal. Large pottery works on the European system have for some years been in operation, both at Jabalpur and Raniganj.

NORTH-WESTERN PROVINCES.—The following places in the North-Western Provinces and Oudh are particularly noted for their fine clay suited for pottery:—Aligarh, Muttra, Amroha in Moradabad, Chunar, Azamgarh, Lucknow, and Rampur State. Clays of various kinds are also to be found in the Bundelkhand and Baghelkhand States of the Central India Agency.

MADRAS.—There are several works in the Madras Presidency, almost all belonging to Europeans, for manufacturing bricks, tiles, cements, etc. Near Rajahmundry in the Godavari district, *kaolin* is reported to exist, of which goglets, some of superior type, are made, but not on a large scale. A small consignment of this clay has, it is said, been exported to England for experimental purposes. Pottery clay also occurs in Mercara in Coorg, where tiles and bricks are manufactured by the Mercara Pottery works. Pottery clay is also reported to be available in large quantities on paddy lands in Changanacherry in Travancore. It is stated that clay used for making bricks, tiles, and pottery is met with in parts of Pudukkottai.

The pottery factory, which was started last year at Harnpur in the Jhelum district of the Panjab, is no longer in existence. *CLAY.*

117. Outturn.—Statistics of outturn during 1894 are available for the following provinces only :—

	Value.	Tons.
	₹	
Madras	Not stated.	285,188
Bengal	Do.*	375,200
Burma	1,58,374	111,527
Coorg	Not given.	1,750
Rajputana	3,738†	133,506†
Central India	1,608	Not given.
Ajmere	2,238	22,832
Mysore	1,78,509	202,194
Tons		1,132,197‡

There are in India some ten pottery works and 23 tile and cement manufactories. The former give employment to something like 1,800 persons, and the published returns of their manufactures was last year R2,17,574, by far the major portion being the Raniganj Pottery works. The tile and cement works give employment to 4,430 persons and turn out goods which last year were valued at R4,77,720.

REFERENCES—POTTERY MATERIALS.—*Records, Geological Survey of India, Vol. XXII, Pt. 2 (1889), pp. 140—148.*

XXXII.—GRANITE (*Bhurbhurá patthar, Hind.*).

118. Occurrence.—In these returns the term granite is employed for all massive crystalline rocks, such as granite proper, gneiss, etc., Rocks of that nature occur plentifully in Western Bengal, in the Madras Presidency, and in the Central Himalaya. Granite appears to be used exclusively for local purposes. It is less employed than formerly, when it was a favourite stone for monolithic structures. The demand for this stone has increased in the Ganjam and Vizagapatam districts of the Madras Presidency since the East Coast Railway works were opened. The quarrying of this stone is briskly carried on all over the district of Cuddapah, where the stone is found in layers at some depth from the surface and is cut in slabs of required sizes by means of chisels. *GRANITE.*

Granite is found in many parts of Cochin and Banganapalle, as also in all hilly localities of Travancore, and in some parts of Pudukkottai. The quantity quarried in 1894 is reported only from Cochin, where it was 36,407 tons.

119. Outturn.—Statistics of production during 1894 have been received from the following provinces:—

	Tons.	Value.
		₹
Madras	500,649	Not given.
Bengal	21,050 §	12,658 §
North-Western Provinces and Oudh	1,501	Not given.
Gwalior, Central India	373 ‖	763 ‖
Burma	4,677	10,258
Coorg	16,249	41,678
Mysore	204,170	4,15,344
Rajputana	24,344 ¶	54,296 ¶
Ajmere	31,558	6,086
Tons	804,571	

In some places of Bengal, granite is worked by quarrying, while in others rocks are broken with heavy iron bars and other implements. The extent of occurrence or production of granite in Bengal cannot be exactly estimated. In Manbhum the estimated production of rubble stone is 488 tons, valued at ₹21; of quartz stone 13,426 tons, valued at ₹2,312.

In Madras it is obtained by blasting or by the use of pick-axes and crowbars, or is otherwise excavated.

The present state of the industry is fair in the Gya district and normal in the Shahabad district of Bengal, but is said to be flourishing in the Tinnevelly and South Arcot districts of Madras. The quantity of granite exported in 1894 by the various railway stations in the Gya district amounted to 7,136 tons, valued at ₹10,325.

XXXIII. LATERITE.

120. Occurrence.—Laterite occupies an important position in the superficial geology of India, and is widely distributed throughout the Peninsula. *LATERITE.*

It has been largely used in the canal works in Orissa as well as for metalling roads and building purposes generally in the localities where it is found.

* For 1893. The estimated production of clays in Burdwan only during 1894 was 8,443 tons, valued at ₹13,041.
† Outturn in Bhurtpore State only.
‡ Incomplete by reason of returns of quantity not given for Central India.
§ Outturn in the Gya and Manbhum districts only.
‖ Estimate for 1893 only. Return for 1894 is blank.
¶ Bhurtpore and Kerowlee States only.

In the Central Provinces various workings are carried on in the Jabalpur, Sihara and Murwara tahsils of the Jabalpur district, and extensive quarryings are reported to be made in the northern taluqs of Ganjam and in Tinnevelly, Madras. *LATERITE.*

Laterite also occurs in the Hanthawaddy, Pegu, Tharrawaddy, Mandalay, Minbu and several other districts of Burma, where the quarries are worked chiefly for the Public Works Department.

121. Outturn.—The estimated production in 1894 is available for the following provinces only :—

	Tons.	Value
		R
Madras	3,647,958	Not given.
Bengal	73,539	Do.
Burma	36,576 *	91,026 *
Coorg	71	52
Mysore	207,247	1,78,906
Rajputana	9,858	3,483
Tons	3,975,249	

XXXIV. LIMESTONE (*Chúná, phúnkne-ka kankar, Hind.*).

122. Occurrence.—Marble (*marmar*), dolomite, serpentine, *kankar*, etc., one or other can hardly be said be to absent from any of the Indian geological formations. They occur in almost all the districts of Madras Presidency. In the Manbhum, Singhbhum, Lohardugga, and several other districts of Bengal. In the Khasia and Jaintia hills, Assam. In the Sambalpur, Raipur, Jabalpur, Nagpur, and Wardha districts of the Central Provinces. They are frequent in the Bombay Presidency and Sind, particularly Kathiwar. Excellent limestone is also met with in Burma, Mysore, Hyderabad, and Baroda. *LIMESTONE.*

The best limestone and marble is probably that met with in the northern part of the Jabalpur district. But good limestone also occurs in the Vindhyan range, in the following Native States of the Central India Agency:—Bundelkhand, Baghelkhand, and Bhopawar; and in several of the Native States of Rajputana, Makrana being the chief. Within a radius of eight miles around Makrana there are something like one hundred quarries. But of these only some fifteen are at present worked.

The Makrana quarries vary in depth from 30 to 75 feet, and follow the lead of the vein. The marble is excavated by blasting, and is then cut into the required size by means of steel saws. It is hauled to the surface on wooden rollers by manual labour, the chips and dust being burnt into chunam, and used for the finer kinds of plastering. The quality of the stone is generally better according to the depth it is worked out, but, owing to the rude appliances used for hoisting it to the surface, it is impossible to work to any great depth. The rates levied by the Marwar Darbar are as follows :—

R1 per maund up to 10 maunds, and 4 annas per additional $2\frac{1}{2}$ maunds.
R2 per maund on all articles such as cups and plates cut from the stone.
R2 per cart-load on coloured marble which is inferior to the white stone.

The revenue derived from the quarries is credited to His Highness's privy purse. From statistics it would appear that the output is declining, which may be accounted for by bad seasons and the demand having lessened owing to the marble quarries started in the Jaipur State. The railway which has been opened through Makrana will, however, certainly give an impetus to further excavation, unless the opinion that the quarries are nearly worked out, expressed by Mr. Foote, the Geological Superintendent of the Baroda State, be found correct.

At Madhogarh in Rewa, Central India, is a quarry that is worked by the Sutna Coal and Lime Co., Ld. For the half-year ending 31st December 1894 R343 was paid as royalty on 137,477 feet of limestone excavated. The weight and estimated value of outturn is not given.

It is stated that the limestone which occurs in the Bag, Ali Rajpur, Jhabua, and Dhar States in Bhopawar, Central India Agency, is largely used by the contractors on the Godra-Rutlam Railway. No returns of output have been furnished.

123. Quarries.—The limestones of the Madras Presidency are, for the most part, collected from the surface; occasionally they are dug out of the earth. In Bengal, some of the quarries are worked with pick-axes and blasting, while in others the stone is excavated by hand labour, or dragged up from the beds of rivers.

In Assam the stone is obtained from three localities: Lakhimpur, the Khasia and Jaintia Hills, and Manipur. In Lakhimpur the *doms* near Sadiya are the only people who collect stones. They go in boats both for the purpose of fishing and of collecting limestones for themselves and for Marwari merchants.

In the Khasia and Jaintia Hills some quarries are worked under leases granted by Government for various periods, and some under permits issued annually by Government. Occasionally in these quarries the stone is detached by blasting with dynamite and gunpowder, and the boulders are then split and broken with native crowbars and hammers. In others no dynamite is used, the stone being workable without blasting.

The limestones of the Bombay Presidency and Sind, particularly that from Jhalavad Prant and the south-west coast of Kathiawar, are admirably suited for building purposes. The Porbundar miliolite and the grey sandstone of Dhangadra are perhaps the best known. The former has recently been conveyed all the way from Kathiawar to be used in the construction of buildings in Calcutta.

Limestone occurs in Burma in the Myaungmya, Amherst, Shwebo, Ye-u, Sagaing, Minbu, Magwe, Thayetmyo, and Myingyan districts. In the Sagaing district it is dug out at the foot of the hills, and is broken into small pieces which are baked in a kiln for three days. They are then taken out, sprinkled with water when the stones resolve into powder. This mixed with sand and glue is used for plastering, etc. Lime powder is put into a cistern, mixed with water and strained through a clot

* It is reported that no explanation can be given for the variation in the figures as compared with the return for 1893.

LIMESTONE. the water which runs through the cloth falling into another cistern or basin. The silt which is formed at the bottom of the basin is used by the natives of Burma for chewing with betel.

Kankar.—Limestone in the nodular form known as *kankar* occurs in Bengal and almost all over the North-Western Provinces, and is very largely used for making lime and metalling roads. There are fifteen *kankar* quarries in the Mozufferpore district of Bengal, of which the most important are at Chandrutti, Kudaria, Harawli, and in the bed of the Khanow and Gundak rivers.

It is also met with in the Gwalior and Baghelkhand States of the Central India Agency. The outturn in 1894 was estimated for the Gwalior States at 1,420 tons, value ₹13,616. Figures showing production in the Baghelkhand States are not given.

124. Outturn.—The estimated production during 1894 was—

	Tons.	Value. ₹
Madras	437,842	Not given.
Bengal	97,619	Do.
Burma	38,414	66,700
Assam	86,415	1,66,433
Mysore	65,378	1,44,284
Rajputana	108,901	1,29,836
Central India	390*	2,416*
Ajmere	9,785	1,264
Baroda	900	2,700
Tons	845,644	

In Bengal the lime-producing industry from local supplies would appear on the whole not very satisfactory; the supply is not equal to the demand.

It is reported of Burma that the Sagaing district production is fairly flourishing. Of Assam it is said that Lakhimpur lime trade is prosperous but dull in the Khasia and Jaintia Hills, while in Manipur the outturn is only nominal.

There are in India 18 lime-burning kilns, the returns of which are regularly published, but these are all located in Burma except one in Madras. These appear to give employment to some 200 persons.

XXXV. SANDSTONE (*Ret-patthar, Hind.*)

SANDSTONE. **125. Occurrence.**—Several of the recognised formations in India, *viz.*, the Vindhyan and Gondwana, cretaceous and tertiary, afford sandstones admirably suited for building, and some of them have from very early times been largely drawn upon for the supply of materials for that purpose. The Vindhyan formation stands pre-eminent, and its stones are used in the construction of the unbricked forts, palaces, and sacred edifices of Delhi, Agra, and Northern India. Sandstone is obtainable in the Ganjam, Vizagapatam, Godavari, Anantapur, Kistna, North Arcot, South Arcot, and Tinnevelly districts of the Madras Presidency, in the Nimar, Chhindwara, Jabalpur, and Saugor districts of the Central Provinces, and in the Agra, Muttra, Jhansi, Hamirpur, Banda, Allahabad, Mirzapur, Dehra Dun, Kumaun, Sultanpur and Garhwal districts of the North-Western Provinces. Chunar, in the Mirzapur district, is particularly famous for its fine sandstone. Sandstone is found in the Manbhum, Shahabad, Monghyr and Cuttack districts of Bengal, in the Baghelkhand and Bhopawar States of the Central India Agency, and in the several States of Rajputana, of which the Tonda hills in the Kishengarh State produce beautiful quartz crystals, but there is no trade in them.

All the hills in Kishengarh belong to the transition series, and supply sandstone for building purposes. Very large and durable slabs and beams are found in certain quarries near the town of Kishengarh. These slabs are greatly prized for roofing purposes, and there is a large trade in them. The quarries are worked by a class of Brahmins called Neharaj or Mohobrahmans.

Sandstone is also found in the Shwebo and Myingyan districts of Upper Burma and in the Hyderabad State. In Bengal, sandstone is worked by quarrying; the present state of the industry is said to be normal.

126. Outturn.—The estimated production in 1894 was—

	Tons.	Value. ₹
Madras	244,913	Not given.
Bengal	49,318†	37,265
North-Western Provinces and Oudh	122,953	Not given.
Central Provinces	31,600‡	Do.
Burma	1,860§	Do.
Ajmere	27,786	14,030
Mysore	26,300	13,050
Rajputana	158,346	1,39,148
Central India	151	Not given.
Baroda	1,800	112
Bengal	8,194	Not given.
	673,221	

FLEXIBLE SANDSTONE OR ITACOLUMITE.—See Records, Geological Survey of India, Vol. XXII, Pt. I (1889), pp. 51—56.

* Incomplete, there being no returns of output in Bhopawar States. For Nagode in the Baghelkhand State the estimated production was valued at ₹1,000, quantity not stated.

† Exclusive of 8,194 tons produced in Monghyr, the value of which is not stated.

‡ For 1890, later figures not being available.

§ Exclusive of broken ballast extracted by the Public Works Department from the Ôkpo hills and used for metalling roads, quantity not stated.

XXXVI. SLABSTONE.

SLABSTONE.

127. Occurrence.—Is met with in the Nizam's Dominions. The estimated production for 1894 is valued at R3,950. Particulars as to quantity are not given.

XXXVII. SLATE (*Shail, Hind.*)

SLATE.

128. Occurrence.—Slate occurs in the Cuddapah, Kistna, and Kurnool districts of the Madras Presidency. Samples of slate are found near the villages of Mohari and Belgoa in the Saugor district of the Central Provinces in the vicinity of the Cawnpore road. In the Bagalkote taluk of Bijapur a hard rock occurs which is prized as a building stone. Slate is also found in Jamalpur and Dhararah hills near Monghyr and in the Kymore hills in Shahabad in Bengal, in the Banda, Jhansi, Dera Dun, Kumaon and Garhwal districts of the North-Western Provinces, in the Simla and the Kangra districts of the Panjab, and in the Jaipur, Ulwar, and Dholepur States of Rajputana. Metamorphic black slate is stated to occur in the Nimkhara Bhumiat in the Bhopawar States of the Central India Agency.

The stone is used for buildings, flagging and other masonry structures, but not extensively, as it cannot be easily split into thin slabs.

129. Outturn.—The estimated production in 1894 has been furnished for the following provinces :—

	Tons.	Value.
		R
Madras	5,959	Not given.
Bengal	215	Do.
Mysore	38	20
Rajputana	4,724	7,644
	10,936	

XXXVIII. TRAP.

TRAP.

130. Occurrence.—This section has been made to include basalt and other massive compact crystalline black or dark-coloured rocks, and occurs chiefly in the Bombay Presidency, Western Bengal, and the Central Provinces, where samples of trap are found all over the Saugor and Mandla districts. The mines at Jamalpur and Dhararah hills in Bengal are worked by Messrs. Stevens, Ambler & Co. It is also found in the Godavari, Kistna, and Trichinopoly districts of the Madras Presidency, and in the north and south-western parts of his Highness the Nizam's dominions. In Jhabua territory, Bhopawar, Central India Agency, Trapstone is said to be used for building purposes, but returns of production are not given.

131. Outturn.—The outturn during 1894 is available for the following provinces only :—

	Tons.	Value.
		R
Madras	18,870	Not given.
Bengal	43,433	Do.
Berar	3,060	Do.
Coorg	765	1,498
Mysore	28	223
	66,156	

XXXIX. OTHER KINDS.

OTHER KINDS.

132. Occurrence.—The returns furnished under this heading include what are designated as Jungle and Rough Stone, Blue Stone, and White Stone, etc. The estimated production during 1894 was as follows :—

	Tons.	Value.
		R
Madras	105,230	Not given.
Berar	3,570	Do.
Central India	414,030	113,042
Rajputana	25,571	6,772
Mysore	7,394	4,360
	555,795	

STATEMENT No. I.

Showing the production of the minerals (Salt, Coal, Iron, and Petroleum) for which statistics are available, for the Calendar year of 1894.

STATEMENT No. I.

Showing the production of minerals for which statistics are available for the Calendar year 1894.

SALT.

PROVINCE.	1894.		1893.		Average of the three years 1891 to 1893.		Percentage on weight of increase or decrease in 1894 compared with	
	Weight in Tons.	Value.	Weight in Tons.	Value.	Weight in Tons.	Value.	1893.	Average of 1891 to 1893.
BRITISH PROVINCES.		₹		₹		₹		
Madras . . .	326,501	*19,25,847*	269,138	*16,58,882*	321,916	*19,97,774*	+21·31	+1·42
Bombay including Sind .	438,229*	*18,39,741*	317,803	*11,56,779*	346,050	*12,11,204*	+37·89	+26·63
Bengal	8,759	*63,419*	1,591	*14,311*	2,193	*19,569*	+450·53	+299·4
North-Western Provinces and Oudh.	1,113	*11,411*	1,137	*11,613*	1,261	*12,874*	—2·11	—11·73
Panjab	104,939	*4,30,334*	104,522	*4,64,489*	106,615	*4,57,186*	+0·39	—1·57
Central Provinces . .	...	...	...	...	...	...	...	...
Assam	...	...	...	...	...	...	...	...
Burma	17,516	*6,97,042*	13,284	*6,65,661*	12,046	*5,72,975*	+31·85	+45·4
Aden	56,175	*3,33,847*	42,278	*2,50,580*	39,588	*2,34,688*	+32·87	+41·89
Total .	953,232	*53,01,641*	749,753	*42,22,315*	829,669	*45,06,270*	+27·13	+14·89
NATIVE STATES.								
Mysore	...	...	...	...	...	...	...	...
Kashmir . . .	2	*33*	3	*100*	...	...	...	...
Baluchistan . .	...	...	...	...	...	...	...	...
Central India Agency† .	614	*Not stated*	653	*4,571*	620	*Not stated*	—5·97	—0·96
Rajputana States . .	339,350	*25,88,447*	83,125	*5,14,879*	83,776	*4,07,433*	+308·24	+305·06
Cutch and Kathiawar .	4,180	*41,508*	4,130	*41,422*	3,545	*30,027*	+1·21	+17·91
Nizam's Dominions .	...	...	...	...	...	...	...	...
Total .	344,146	*26,29,988*	87,911	*5,60,972*	87,941	*4,37,460*	+291·47	+291·33
TOTAL BRITISH PROVINCES AND NATIVE STATES.	1,297,378	***79,31,629***	837,664	***47,83,287***	917,610	***49,43,730***	+54·88	+41·38

* The returns of Cutch and Kathiawar have been isolated from the provincial figures.
† Relates to Gwalior.

STATEMENT No. I.

Showing the production of minerals for which statistics are available for the Calendar year 1894.

COAL.

PROVINCE.	1894.		1893.		Average of the three years 1891 to 1893.		Percentage on weight of increase or decrease in 1894 compared with	
	Weight in Tons.	Value.	Weight in Tons.	Value.	Weight in Tons.	Value.	1893.	Average of 1891 to 1893.
		R		R		R		
BRITISH PROVINCES.								
Madras	1,337	8,022	502	2,510*	194	971*	+166·33	+589·17
Bombay including Sind	...	...	...	...	...	...	...	...
Bengal	1,989,375	61,54,409	1,870,720	50,20,320	1,845,964	48,33,722	+6·34	+7·76
North-Western Provinces and Oudh.	...	...	...	...	...	...	...	...
Panjab	66,467	5,24,988	77,294	6,08,334	68,120	5,59,861	—14·0	—2·42
Central Provinces	140,495	6,39,058	135,118	6,35,555	136,286	6,65,681	+3·98	+3·08
Assam	169,448	11,85,954	164,420	11,50,688	160,892	11,26,083	+3·05	+5·31
Burma	12,111	1,08,999	9,938	64,597	4,536	36,212	+21·86	+166·99
Total	2,379,233	86,21,430	2,257,992	74,82,004	2,215,992	72,22,530	+5·36	+7·36
NATIVE STATES.								
Mysore	...	...	...	...	...	...	...	...
Kashmir	...	...	...	...	...	...	...	...
Baluchistan	21,498	2,68,892	20,094	2,43,710	14,582	1,80,519	+6·98	+47·42
Central India Agency	132,837	4,53,255	94,348	3,46,101	84,237	3,21,458	+40·79	+57·69
Rajputana States	...	...	...	...	...	...	...	...
Nizam's Dominions	240,525	8,41,837	157,421	5,50,973	150,563	5,73,485	+52·79	+59·75
Total	394,860	15,63,984	271,863	11,40,784	249,382	10,75,462	+45·24	+58·33
TOTAL BRITISH PROVINCES AND NATIVE STATES.	2,774,093	1,01,85,414	2,529,855	86,22,788	2,465,374	82,97,992	+9·65	+12·52

* Estimate only made on previous returns @ Rs per ton.

STATEMENT No. I.

Showing the production of minerals for which statistics are available for the Calendar year 1894.

IRON ORES.

PROVINCE.	1894.		1893.		Average of the three years 1891 to 1893.		Percentage on weight of increase or decrease in 1894 compared with	
	Weight in Tons.	Value.	Weight in in Tons.	Value.	Weight in Tons.	Value.	1893.	Average of three years 1891 to 1893.
BRITISH PROVINCES.		₹		₹		₹		
Madras	2,999*	2,002	677	711	451	3,173	+342·98	+564·96
Bombay including Sind	...	...	...	...	...	...	...	...
Bengal	24,759	80,696	29,930	90,842	23,141	56,977	−17·27	+6·99
North-Western Provinces and Oudh.	...	...	...	...	...	...	...	...
Panjab	20	102	22	77	13	105	−9·09	+53·84
Central Provinces	6,181	13,753	3,332	8,649	4,566	11,110	+85·50	+35·37
Assam	...	...	...	...	...	...	...	...
Burma	...	...	...	...	...	...	...	...
Total	33,959	96,553	33,961	1,00,279	28,171	71,365	−0·006	+20·54
NATIVE STATES.								
Mysore	972	7,871	707	12,785	458	10,690	+37·48	+112·22
Kashmir	...	...	...	...	...	...	...	...
Baluchistan	...	...	...	...	...	...	...	...
Central India Agency	2,685†	1,01,424†	1,667‡	85,585‡	1,805	1,15,945	...	...
Rajputana States	774	41,735	767	29,280	702	27,066	+0·91	+10·25
Nizam's Dominions	No returns	2,813	No returns	3,442	No returns	3,816	−18·26	−26·28
Total	4,431§	1,53,843	3,141	1,31,092	2,965	1,57,517	+41·06	+49·44
TOTAL BRITISH PROVINCES AND NATIVE STATES.	38,390§	2,50,396	37,102	2,31,371	31,136	2,28,882	+3·47	+23·29

* Of the amounts returned for Madras 1,369 tons was produced by the Native State of Sandur. Ore is found in many parts of Travancore, but no returns are available.

† Relates to Gwalior (production in 1894, 801 tons, valued at ₹5,889), Bundelkhand, Baghelkhand, Bhopawar, and Goona.

‡ Relates to Gwalior State only.

§ Incomplete because of no returns of production in Nizam's Dominions.

STATEMENT No. I.

Showing the production of minerals for which statistics are available for the Calendar year 1894.

PETROLEUM.

PROVINCE.	1894.		1893.		Average of the three years 1891 to 1893.		Percentage on quantity of increase or decrease in 1894 compared with	
	Quantity in Gallons.	Value.	Quantity in Gallons.	Value.	Quantity in Gallons.	Value.	1893.	Average of the three years 1891 to 1893.
		R		*R*		*R*		
BRITISH PROVINCES.								
Madras	...	...	...	...	...	...	...	...
Bombay including Sind	...	...	...	...	...	...	...	...
Bengal	...	...	...	...	...	...	...	...
North-Western Provinces and Oudh.	...	...	...	...	...	...	...	...
Panjab	1,742	*409*	1,852	*433*	2,083	*559*	—5·93	—16·37
Central Provinces	...	...	...	...	...	...	...	...
Assam	166,904	*33,380*	81,742	*12,498*	42,079	*7,774*	+104·18	+296·64
Burma	10,920,951	*10,57,545*	10,276,218	*7,84,336*	8,315,968	*5,39,218*	+6·27	+31·32
Total	11,089,597	*10,91,334*	10,359,812	*7,97,267*	8,360,130	*5,47,551*	+7·04	+32·64
NATIVE STATES.								
Mysore	...	...	...	...	...	...	...	...
Kashmir	...	...	...	...	...	...	...	...
Baluchistan	50,000	*9,375*	No returns.		70,622*	*4,089**	...	—29·2*
Central India Agency	...	...	...	...	...	...	...	...
Rajputana States	...	...	...	...	...	...	...	...
Nizam's Dominions	...	...	...	...	...	...	...	...
Total	50,000	*9,375*	...	...	70,622	*4,089*	...	—29·2
TOTAL BRITISH PROVINCES AND NATIVE STATES.	1,597	***11,00,709***	10,359,812	***7,97,267***	8,430,752	***5,51,640***	+7·52	+32·13

* No production recorded for 1893 : the total produced within the three years of 1891, 1892, and 1893 when expressed to an average is abnormally reduced; the average produced in 1890, 1891, 1892 came to 137,902 gallons.

Weights of Salt, Coal, Iron, and Petroleum carried by Rail and River in British India between 1st April 1893 and 31st March 1894.

TRAFFIC II

Weight of Salt carried by Rail and River in Britis

NOTE.—The figures read vertically are the import

WHENCE EXPORTED.	IMPORTED									
	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
Madras	...	2	...	...	...	...	...	...	...	2
Bombay	38,246	...	...	...	640,444	10,849	1,452,280	420,231	...	2,562,050
Sind	...	...	...	...	...	3,167	...	...	...	3,167
Bengal	...	...	...	...	5,706	348	12	...	91,304	97,370
North-West Provinces and Oudh.	...	2	...	3,334	...	2,626	13,184	66	...	19,212
Panjab	...	...	8,894	97,296	275,323	...	103	...	...	381,616
Central Provinces	...	10	...	2,673	11	...	...	2	...	2,696
Berar	...	...	...	...	...	...	558	...	...	558
Assam	...	...	...	770	...	...	...	...	...	770
Total	*38,246*	*14*	*8,894*	*104,073*	*921,484*	*16,990*	*1,466,137*	*420,299*	*91,304*	*3,067,441*
NATIVE STATES.										
Rajputana and Central India.	...	15	...	...	2,874,708	237,015	104,550	...	...	3,216,288
Nizam's Dominions	3	1,254	...	...	...	...	...	49	...	1,306
Mysore	86	111	...	...	...	...	...	...	...	197
Total	*89*	*1,380*	...	...	*2,874,708*	*237,015*	*104,550*	*49*	...	*3,217,791*
CHIEF SEAPORT TOWNS.										
Madras Seaports*	2,291,735	26	...	...	...	...	...	...	...	2,291,761
Bombay	41,101	21,907	...	8	2,762	27	3,350	6,213	...	75,368
Karachi	...	...	192,928	...	2	477	...	...	...	193,407
Calcutta	...	...	...	7,456,463	315,625	8	2,069	...	471,010	8,245,175
Total	*2,332,836*	*21,933*	*192,928*	*7,456,471*	*318,389*	*512*	*5,419*	*6,213*	*471,010*	*10,805,711*
*GRAND TOTAL IN MAUNDS	*2,371,171*	*23,327*	*201,822*	*7,560,544*	*4,114,581*	*254,517*	*1,576,106*	*426,561*	*562,314*	*17,090,943*
GRAND TOTAL IN TONS.	86,785	854	7,387	276,716	150,594	9,315	57,685	15,612	20,580	625,528

* Those touched by railways, *viz.*, Madras

SALT.

India between 1st April 1893 and 31st March 1894.

those read horizontally are the exports.

INTO

NATIVE STATES.				CHIEF SEAPORT TOWNS.					GRAND TOTAL.		WHENCE EXPORTED.
Rajputana and Central India.	Nizam's Territory.	Mysore.	Total.	Madras Seaports.*	Bombay.	Karachi.	Calcutta.	Total.			
Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Tons.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).
...	108,736	7,062	115,798	63	...	...	...	63	*115,863*	4,241	Madras.
401,101	556,633	76,380	1,034,114	...	632	...	...	632	*3,596,796*	131,643	Bombay.
...	...	...	...	...	...	...	...	...	*3,167*	116	Sind.
755	...	...	755	...	...	...	224	224	*98,349*	3,600	Bengal.
51,772	...	...	51,772	...	...	...	1,216	1,216	*72,200*	2,643	North-West Provinces and Oudh.
707	...	...	707	...	...	129	704	833	*383,156*	14,028	Panjab.
21,139	...	...	21,139	...	...	...	...	...	*23,835*	872	Central Provinces.
...	...	...	...	...	...	...	...	...	*558*	20	Berar.
...	...	...	...	...	...	...	1	1	*771*	28	Assam.
475,474	*665,369*	*83,442*	*1,224,285*	*63*	*632*	*129*	*2,145*	*2,969*	***4,294,695***	157,186	Total.
											NATIVE STATES.
...	...	...	...	...	...	...	186	186	*3,216,474*	117,723	Rajputana and Central India.
...	...	...	...	...	...	...	...	...	*1,306*	47	Nizam's Dominions.
...	...	...	...	1	...	...	...	1	*198*	7	Mysore.
...	...	...	...	*1*	...	...	*186*	*187*	***3,217,978***	117,777	Total.
											CHIEF SEAPORT TOWNS.
...	7,001	123,192	130,193	...	...	...	...	...	*2,421,954*	88,643	Madras Seaports.*
107	97,529	247,016	344,652	...	...	...	...	...	*420,020*	15,373	Bombay.
...	...	...	...	...	...	...	...	...	*193,407*	7,079	Karachi.
...	...	...	...	...	...	...	...	...	*8,245,175*	301,773	Calcutta.
107	*104,530*	*370,208*	*474,845*	...	...	...	...	...	***11,280,556***	412,868	Total.
475,581	*769,899*	*453,650*	*1,699,130*	*64*	*632*	*129*	*2,331*	*3,156*	***18,793,229***	...	GRAND TOTAL IN MAUNDS.
17,406	28,178	16,604	62,188	2	23	5	85	115	...	687,831	GRAND TOTAL IN TONS.

* Pondicherry, Negapatam, Tuticorin and Calicut.

Weight of Coal and Coke carried by Rail and River in British

NOTE.—The figures read vertically are the imports,

WHENCE EXPORTED.	IMPORTED									
	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
Madras . . .	...	23,848	...	...	...	...	...	...	...	23,848
Bombay . . .	...	...	...	...	470	...	2,507	12,293	...	15,270
Sind	...	...	...	...	...	740	...	...	...	740
Bengal	...	197,347	...	...	8,236,673	225,260	842,384	144,674	49,125	9,695,463
North-West Provinces and Oudh.	...	857	...	382	...	1,289,379	152,096	...	...	1,442,714
Panjab	...	...	...	...	1,141	...	...	...	...	1,141
Central Provinces . .	...	1,257,811	...	...	1,746	...	...	855,352	...	2,114,909
Berar	...	48,464	...	...	...	...	21	...	...	48,485
Assam	...	...	...	1,195,460	...	...	...	...	...	1,195,460
Total .	...	*1,528,327*	...	*1,195,842*	*8,240,030*	*1,515,379*	*997,008*	*1,012,319*	*49,125*	*14,538,030*
NATIVE STATES.										
Rajputana and Central India.	...	4,427	...	2,695	1,280,654	3,476	1,371,543	2,345	...	2,665,140
Nizam's Dominions .	1,553,634	1,190,988	...	...	...	...	...	...	...	2,744,622
Mysore . . .	343	...	...	...	...	...	...	...	...	343
Total .	*1,553,977*	*1,195,415*	...	*2,695*	*1,280,654*	*3,476*	*1,371,543*	*2,345*	...	*5,410,105*
CHIEF SEAPORT TOWNS.										
Madras Seaports* . .	441,913	6	...	...	...	...	...	...	...	441,919
Bombay	606	2,245,589	...	...	300	28	53,761	1,282	...	2,301,566
Karachi . . .	...	...	130,294	...	...	17,332	...	...	...	147,626
Calcutta . . .	...	...	...	954,620	5,316	2,672	...	...	182,701	1,145,309
Total .	*442,519*	*2,245,595*	*130,294*	*954,620*	*5,616*	*20,032*	*53,761*	*1,282*	*182,701*	*4,036,420*
GRAND TOTAL IN MAUNDS	*1,996,496*	*4,969,337*	*130,294*	*2,153,157*	*9,526,300*	*1,538,887*	*2,422,312*	*1,015,946*	*231,826*	*23,984,555*
GRAND TOTAL IN TONS	73,072	181,878	4,769	78,805	348,662	56,323	88,657	37,184	8,485	877,835

* Those touched by railways, *viz.*, Madras,

COAL.

India between 1st April 1893 and 31st March 1894.

those read horizontally are the exports.

INTO											
NATIVE STATES.				CHIEF SEAPORT TOWNS.					GRAND TOTAL.		WHENCE EXPORTED.
Rajputana and Central India.	Nizam's Territory.	Mysore.	Total.	Madras Seaports.*	Bombay.	Karachi.	Calcutta.	Total.			
Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Tons.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).
...	1,925	52,905	54,830	37,355	...	...	...	37,355	***116,033***	4,247	Madras.
257,845	3,245	...	261,090	...	323,350	...	...	323,350	***599,710***	21,949	Bombay.
...	...	...	...	...	...	340	...	340	***1,080***	40	Sind.
358,958	...	...	358,958	...	20,566	...	22,779,812	22,800,378	***32,854,799***	1,202,486	Bengal.
326,135	...	...	326,135	...	20	...	...	20	***1,768,869***	64,741	North-West Provinces and Oudh.
...	...	...	...	...	...	...	...	...	***1,141***	42	Panjab.
143,079	...	...	143,079	...	544	...	...	544	***2,258,532***	82,662	Central Provinces.
...	...	...	...	...	1,818	...	...	1,818	***50,303***	1,841	Berar.
...	...	...	...	...	...	...	572,884	572,884	***1,768,644***	64,721	Assam.
1,086,017	*5,170*	*52,905*	*1,144,092*	*37,355*	*346,298*	*340*	*23,352,696*	*23,736,689*	***39,418,811***	1,442,729	Total.
											NATIVE STATES.
...	...	...	...	...	...	...	...	...	***2,665,140***	97,544	Rajputana and Central India.
...	...	..	...	...	45	...	...	45	***2,744,667***	100,455	Nizam's Dominions.
...	...	...	...	6	...	...	...	6	***349***	13	Mysore.
...	...	...	...	*6*	*45*	...	...	*51*	***5,410,156***	198,012	Total.
											CHIEF SEAPORT TOWNS.
...	706	1,811,705	1,812,411	...	9	...	...	9	***2,254,339***	82,509	Madras Seaports.*
2,725	2,023	...	4,748	...	...	...	...	...	***2,306,314***	84,411	Bombay.
...	...	...	...	...	...	...	...	...	***147,626***	5,403	Karachi.
...	...	...	...	1	1	...	...	2	***1,145,311***	41,918	Calcutta.
2,725	*2,729*	*1,811,705*	*1,817,159*	*1*	*10*	...	...	*11*	***5,853,590***	214,241	Total.
1,088,742	*7,899*	*1,864,610*	*2,961,251*	*37,362*	*346,353*	*340*	*23,352,696*	*23,736,751*	***50,682,557***	...	GRAND TOTAL IN MAUNDS.
39,848	289	68,245	108,382	1,367	12,677	12	854,709	868,765	...	1,854,982	GRAND TOTAL IN TONS.

*Pondicherry, Negapatam, Tuticorin and Calicut.

TRAFFIC IN

Weight of Iron carried by Rail and River in British India

NOTE.—The figures read vertically are the imports,

WHENCE EXPORTED.	IMPORTED									
	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).										
Madras	...	6,400	...	...	5	65	...	...	...	6,470
Bombay	8,097	...	...	...	245	1,238	4,452	7,891	...	21,923
Sind	2	...	...	...	47	18,183	...	...	...	18,232
Bengal	...	4	...	...	124,335	18,185	4,802	...	3,597	150,923
North-West Provinces and Oudh	123	461	227	124,941	...	55,307	12,581	96	...	193,736
Panjab	6	152	3,355	2,335	96,986	...	211	16	...	103,061
Central Provinces	42	928	...	5,538	7,448	1,530	...	2,782	...	18,268
Berar	7	1,160	...	...	502	4	1,612	...	...	3,285
Assam	...	...	...	1,150	...	...	...	...	...	1,150
Total	*8,277*	*9,105*	*3,582*	*133,964*	*229,568*	*94,512*	*23,658*	*10,785*	*3,597*	*517,048*
NATIVE STATES.										
Rajputana and Central India	...	10,385	23	239	23,877	5,854	10,038	64	...	50,480
Nizam's Dominions	1,434	758	...	...	4	...	904	10	...	3,110
Mysore	4,186	1,617	...	...	2	...	4	2	...	5,811
Total	*5,620*	*12,760*	*23*	*239*	*23,883*	*5,854*	*10,946*	*76*	...	*59,401*
CHIEF SEAPORT TOWNS.										
Madras Seaports*	625,321	2,208	...	5	3	66	26	3	...	627,632
Bombay	14,428	969,464	9	88	123,951	104,104	141,985	116,538	...	1,470,567
Karachi	...	...	50,058	141	64,552	473,811	...	...	...	588,562
Calcutta	47	713	43	1,164,231	1,082,480	76,182	56,238	89	195,928	2,575,951
Total	*639,796*	*972,385*	*50,110*	*1,164,465*	*1,270,986*	*654,163*	*198,249*	*116,630*	*195,928*	*5,262,712*
GRAND TOTAL IN MAUNDS	*653,693*	*994,250*	*53,715*	*1,298,668*	*1,524,437*	*754,529*	*232,853*	*127,491*	*199,525*	*5,839,161*
GRAND TOTAL IN TONS	23,925	36,93	1,966	47,531	55,794	27,616	8,523	4,666	7,303	213,713

* Madras seaports are those touched by railways, *viz.*,

IRON.

between 1st April 1893 and 31st March 1894.

those read horizontally are the exports.

INTO											
NATIVE STATES.				CHIEF SEAPORT TOWNS.					GRAND TOTAL.		WHENCE EXPORTED.
Rajputana and Central India.	Nizam's Territory.	Mysore.	Total.	Madras seaports.*	Bombay.	Karachi.	Calcutta.	Total.			
Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Tons.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).
...	11,861	9,434	21,295	74,546	841	...	14	75,401	***103,166***	3,776	Madras.
11,462	6,525	5,438	23,425	470	16,497	...	4	16,971	***62,319***	2,282	Bombay.
...	...	...	...	...	11	5,483	...	5,494	***23,726***	868	Sind.
1,452	...	...	1,452	...	27	...	195,987	196,014	***348,389***	12,751	Bengal.
29,754	281	17	30,052	91	409	156	9,825	10,481	***234,269***	8,574	North-West Provinces and Oudh.
13,645	158	...	13,803	20	399	1,496	676	2,591	***119,455***	4,372	Panjab.
8,064	98	...	8,162	1	1,244	...	1,318	2,563	***28,993***	1,061	Central Provinces.
4,074	15	4	4,093	...	1,268	...	1	1,269	***8,647***	316	Berar.
...	...	...	...	...	...	...	1,300	1,300	***2,450***	90	Assam.
68451	*18,938*	*14,893*	*102,282*	*75,128*	*20,696*	*7,135*	*209,125*	*312,084*	***931,414***	34,090	Total.
											NATIVE STATES.
...	...	...	...	33	350	...	72	455	***50,935***	1,864	Rajputana and Central India.
...	...	...	...	8,459	692	...	2	9,153	***12,263***	449	Nizam's Dominions.
...	...	...	...	12,207	28	...	...	12,235	***18,046***	660	Mysore.
...	...	...	...	*20,699*	*1,070*	...	*74*	*21,843*	***81,244***	2,973	Total.
											CHIEF SEAPORT TOWNS.
7	5,358	251,148	256,513	...	152	...	2	154	***884,299***	32,365	Madras Seaports.*
202,601	114,128	20,465	337,194	4,822	...	1	305	5,128	***1,812,889***	66,352	Bombay.
529	...	...	529	...	...	...	...	...	***589,091***	21,561	Karachi.
8,324	130	32	8,486	5	369	21	...	395	***2,584,832***	94,605	Calcutta.
211,461	*119,616*	*271,645*	*602,722*	*4,827*	*521*	*22*	*307*	*5,677*	***5,871,111***	214,883	Total.
279,912	*138,554*	*286,538*	*705,004*	*100,654*	*22,287*	*7,157*	*209,506*	*339,604*	***6,883,769***	...	GRAND TOTAL IN MAUNDS.
10,265	5,071	10,487	25,803	3,684	816	262	7,668	12,430	...	251,948	GRAND TOTAL IN TONS.

Madras, Pondicherry, Negapatam, Tuticorin and Calicut.

TRAFFIC IN

Weight of Petroleum (Kerosine) carried by Rail and River in British India

NOTE.—The figures read vertically are the imports

WHENCE EXPORTED.	IMPORTED									
	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).										
Madras	...	...	...	...	...	...	...	...	...	...
Bombay	21,848	...	...	...	...	...	9,994	28,113	...	59,955
Sind	...	...	...	...	...	4,764	...	...	...	4,764
Bengal	...	...	...	...	446,671	57,822	156,131	1,134	62,241	723,999
North-West Provinces and Oudh.	...	27	...	190	...	6,478	273	...	...	6,968
Panjab	...	...	85	...	955	...	...	...	...	1,040
Central Provinces	...	...	...	101	30	...	...	22	...	153
Berar	...	21	...	...	...	...	46	...	...	67
Assam	...	...	...	491	...	...	...	...	...	491
Total	*21,848*	*48*	*85*	*782*	*447,656*	*69,064*	*166,444*	*29,269*	*62,241*	*797,437*
NATIVE STATES.										
Rajputana and Central India.	...	2	...	...	247	2	216	...	...	467
Nizam's Territory	112	...	...	...	...	...	...	...	...	112
Mysore	523	34	...	...	...	...	...	...	...	557
Total	*635*	*36*	...	...	*247*	*2*	*216*	...	...	*1,136*
CHIEF SEAPORT TOWNS.										
Madras seaports*	158,958	...	...	...	...	...	...	...	...	158,958
Bombay	1,263	298,597	...	...	11,947	12,114	104,241	129,216	...	557,378
Karachi	...	...	9,568	...	672	176,622	...	...	...	186,862
Calcutta	...	...	...	900,397	8,285	1,816	1,138	...	133,826	1,045,462
Total	*160,221*	*298,597*	*9,568*	*900,397*	*20,904*	*190,552*	*105,379*	*129,216*	*133,826*	*1,948,660*
GRAND TOTAL IN MAUNDS	*182,704*	*298,681*	*9,653*	*901,179*	*468,807*	*259,618*	*272,039*	*158,485*	*196,067*	*2,747,233*
GRAND TOTAL IN GALLONS.	1,461,632	2,389,448	77,224	7,209,432	3,750,456	2,076,944	2,176,312	1,267,880	1,568,536	21,977,864

*Those touched by railways, *viz.*, Madras.

PETROLEUM.

between 1st April 1893 and 31st March 1894.

those read horizontally are the exports.

INTO											
NATIVE STATES.				CHIEF SEAPORT TOWNS.					GRAND TOTAL.		WHENCE EXPORTED.
Rajputana and Central India.	Nizam's Territory.	Mysore.	Total.	Madras sea-ports.*	Bombay	Karachi.	Calcutta.	Total.			
Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Gallons.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORT TOWNS).
...	8,525	122	8,647	867	...	...	...	867	*9,514*	76,112	Madras.
1,718	7,241	53,501	62,460	...	93	...	...	93	*122,508*	980,064	Bombay.
...	...	...	...	...	...	...	...	...	*4,764*	38,112	Sind.
13,827	...	...	13,827	...	...	...	134,161	134,161	*871,987*	6,975,896	Bengal.
4,268	...	...	4,268	...	...	...	6	6	*11,242*	89,936	North-West Provinces and Oudh.
752	...	...	752	...	...	...	...	...	*1,792*	14,336	Panjab.
805	...	...	805	...	1	...	...	1	*959*	7,672	Central Provinces.
...	...	...	...	...	...	...	...	...	*67*	536	Berar.
...	...	...	...	...	...	...	3	3	*494*	3,952	Assam.
21,370	*15,766*	*53,623*	*90,759*	*867*	*94*	...	*134,170*	*135,131*	***1,023,327***	8,186,616	Total.
											NATIVE STATES.
...	...	...	...	...	...	...	...	...	*467*	3,736	Rajputana and Central India.
...	...	...	...	...	90	...	...	90	*202*	1,616	Nizam's Territory.
...	...	...	...	...	...	...	...	...	*557*	4,456	Mysore.
...	...	...	...	...	*90*	...	...	*90*	***1,226***	9,808	Total.
											CHIEF SEAPORT TOWNS.
...	13,909	42,978	56,887	...	...	...	...	...	*215,845*	1,726,760	Madras seaports.*
114,973	41,036	7,311	163,320	4	...	...	...	4	*720,702*	5,765,616	Bombay.
...	...	...	...	...	...	...	...	...	*186,862*	1,494,896	Karachi.
355	...	...	355	...	...	...	...	...	*1,045,817*	8,366,536	Calcutta.
115,328	*54,945*	*50,289*	*220,562*	*4*	...	...	...	4	***2,169,226***	17,353,808	Total.
136,698	*70,711*	*103,912*	*311,321*	*871*	*184*	...	*134,170*	*135,225*	***3,193,779***	...	GRAND TOTAL IN MAUNDS.
1,093,584	565,688	831,296	2,490,568	6,968	1,472	...	1,073,360	1,081,800	...	25,550,232	GRAND TOTAL IN GALLONS.

*Pondicherry, Negapatam, Tuticorin and Calicut.

APPENDIX II.

ABSTRACT AND INDEX TO CHIEF MINERALS.

The statistical information on the subject of the total production and labour employed at the Indian mines and mining industries is too fragmentary to justify the preparation of a tabular statement, based on available returns. The following quotations have been mentioned, however, in the above Review, and it may serve a useful purpose to bring them together, though of course the statement thus produced should not be regarded as complete.

It would seem probable that the total number of persons employed in India at the Mines, Foundries, Pottery works, etc., etc., do not exceed 100,000. The rural artizans engaged in the metallic and ceramic industries are of course a much larger body, but it would be useless to speculate either as to their number or the extent of the manufactures turned out by them. It is perhaps sufficient to remind the reader that the returns (shown above) of such ores as Iron do not express anything like the actual amount of that substance used up annually. Leaving out of account the imported metal it may be said that a large traffic exists all over the country in collecting the ore, found on the surface of the ground, in crudely smelting it, and in supplying the produce to the village blacksmiths. Similarly the returns of the pottery works give no indication whatever of the vast population in India who find their livelihood in producing the cruder earthen vessels that are in daily use by the bulk of the population. The particulars brought together in the table below may, therefore, be said to represent the industries that are either under European management or are conducted on European methods. They are the particulars in other words of what might be spoken of as the larger firms, public companies, and Government Departments who regularly furnish returns of their transactions.

Metals and Minerals (chief Localities).	Quantity.	Value.	Number of persons employed.	Page.
		R		
1. SALT—				
British India . . .	Tons. 953,232	53,01,641	No returns.	1—5, 34,
Native States . . .	„ 344,146	26,29,988		40-41.
2. COAL—				
British India . . .	„ 2,379,233	86,21,430	42,521	5—9, 35,
Native States . . .	„ 394,860	15,63,984		42-43.
3. IRON ORES—				
British India . . .	„ 33,959	96,553	(Barakar Iron Works.)	9—12, 36,
Native States . . .	„ 4,431	1,53,843	714 Native Iron Works.	44-45.
4. PETROLEUM—				
British India . . .	Gallons 11,089,597	10,91,334	936	12—14, 37,
Native States . . .	„ 50,000	9,375		46-47.
5. GOLD—				
(*a*) North Arcot . .	.....	.....	117	14—16.
(*b*) Mysore . . .	Oz. 210,082	1,42,53,856	No returns.	
(*c*) River Sand Washings	„ 1,688	86,352	.....	
6. AMBER	lbs. 87	160	.....	16.
7. BERYL	.....	.....	.....	16.
8. DIAMOND—				
Bundelkhand . .	Carats 210¾	16,251	.....	16-17.
9. GARNET. . . .	.....	.....	.....	17.
10. JADE—				
Burma . . .	Cwt. 727	1,15,091	.....	17.
11. QUARTZ. . . .	.....	.....	.....	17-18.
12. RUBY—				
Burma . . .	Number not given.	Estimated 10,00,000	218 + 218	18.

Metals and Minerals (chief Localities).	Quantity.	Value.	Number of persons employed.	Page.
		R		
13. ALUM.	.....	.....	No returns.	18.
14. ANTIMONY	Tons 411	.....	.....	18-19.
15. ASBESTOS	.....	.....	.....	19.
16. BORAX	.....	.....	.....	19-20.
17. COPPER—				
Bengal	,, 2,500*	1,32,500	.....	20.
18. CORUNDUM—				
(*a*) Mysore	,, 43	3,453	.....	20-21.
(*b*) Madras	,, 3	.....	.....	
19. GYPSUM (Rajputana) . .	,, 3,169	2,034	.....	21.
20. LEAD.	.....	.....	.....	21-22.
21. MAGNESIA	.....	.....	.....	22.
22. MANGANESE ORES—				
Madras	,, 11,400	.....	.....	22.
23. MICA—				
Bengal	,, 175	1,45,208	1,882 + 570	22-23.
Madras	,, 3	.....		
Mysore	,, 2½	180		
24. PLUMBAGO—				
Travancore	,, 1,597	.....	No returns.	23.
25. SOAPSTONE— . . .				
Jhansi, North-Western Provinces.	,, 92	Not stated.	200	23-24.
Madras	,, 58	Ditto.		
Minbu, Burma . . .	,, 16	12,500		
Hyderabad, Deccan . .	Not stated.	117		
Mysore	Tons 597	2,252		
Central India . . .	Not stated.	2,025		
26. TIN—				
Mergui, Burma . . .	Tons 98	89,650	407 + 205	24-25
27. MINERAL PAINT AND OCHRE. .	.....	.....	No returns.	25.
28. FULLER'S EARTH . . .	,, 715†	3,000	.....	25-26.
SOAPSAND	,, 190	Not stated.	.....	26.
29. SALTPETRE	,, 10,217	15,89,395	8,328	26-27.
30. SODA SALTS— . . .	.....	.....	No returns.	28.
31. CLAY	,, 1,132,197	Not given.	.....	27-28.
POTTERY CLAYS, JABALPUR—				
Raniganj				
Aligarh				
Chunar	Two chief classes of works that use up clay, *viz.*, (*a*) Pottery Works and (*b*) Tile and Cement Factories.			
Lucknow				
Rampur				
Rajahmundry (Kaolin) . .	...	Produce (*a*) R2,17,574	1,800	
Multan, etc., etc. . . .	.....	(*b*) R4,77,720	4,430	

* Returns of 1892.
† Figures of 1893.

Metals and Minerals (chief Localities).	Quantity.	Value.	Number of persons employed.	Page.
		£		
32. GRANITE	Tons. 804,571	.....		28.
33. LATERITE	„ 3,975,249	.....		28-29.
34. LIMESTONE	„ 846,502	No valuation furnished. These stones are obtained for the most part from quarries and these give employment to	2,800	29-30.
35. SANDSTONE	„ 673,070			30.
36. SLABSTONE	.....			31.
37. SLATE	„ 10,936			31.
38. TRAP	„ 66,156	.....		31.
39. OTHER STONES . . .	„ 141,765	.....		32.
In addition to the above there are some 38 Iron and Brass Foundries that doubtless do a certain amount of smelting or at least purifying of the native crudely smelted Iron and other metals. These gives employment to			12,000	
		Total shown above . .	71,711	

APPENDIX I.

Statement of Mineral grants and licenses made from the year 1889 to 1894 inclusive.

Statement of Mineral grants and licenses made from the year 1889 to 1894 inclusive.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
1. Madras .	Godavari, Bhadrachalam Taluk.	Godavari Coal Co. (Messrs. Binny & Co.)	Coal . .	M. L. .	10⅛ square miles . . .	...	20 years.
2. Madras .	Godavari, Bhadrachalam Taluk.	Eyekirl Hugh Philips.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
3. Madras .	Godavari, Bhadrachalam Taluk.	George Lawson Chambers.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
4. Madras .	Godavari, Bhadrachalam Taluk.	John Alexander Boyson.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
5. Madras .	Godavari, Bhadrachalam Taluk.	Archibald Hunter MacMillan.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
6. Madras .	Godavari. Bhadrachalam Taluk.	Stuart Hall . .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
7. Madras .	Godavari, Bhadrachalam Taluk.	Alister Macnab .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
8. Madras .	Godavari, Bhadrachalam Taluk.	Dorning Rasbotham.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
9. Madras .	Godavari, Bhadrachalam Taluk.	Clement Bell Simpson.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
10. Madras .	Godavari, Bhadrachalam Taluk.	John Campbell .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
11. Madras .	Godavari, Bhadrachalam Taluk	William Lambert .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
12. Madras .	Godavari, Bhadrachalam Taluk.	John Wilkinson Chambres.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
13. Madras .	Godavari, Bhadrachalam Taluk.	Alfred Percival Symonds.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
14. Madras .	Goda vari, Bhadrachalam Taluk.	Thomas Kipping .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
15. Madras .	Godavari, Bhadrachalam Taluk.	Arthur Worthington Maude.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
16. Madras .	Godavari, Bhadrachalam Taluk.	George Henry White.	Coal . .	P. L. .	Half a square mile . . .	21st March 1890.	6 months.
17. Madras .	Godavari, Bhadrachalam Taluk.	William Martin .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
18. Madras .	Godavari, Bhadrachalam Taluk.	Herbert Phillips .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
19. Madras .	Godavari, Bhadrachalam Taluk.	William Young Fleming.	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
20. Madras .	Godavari, Bhadrachalam Taluk.	William Macnab .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
21. Madras .	Godavari, Bhadrachalam Taluk.	Francis Phillips .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.

NOTE.—P. L. denotes Prospecting License, E. L. denotes Exploring License, M. L. denotes Mining Lease,

Statement of Mineral grants and licenses made from the year 1889 to 1894 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
22. Madras .	Godavari, Bhadrachalam Taluk.	Hugh Garden .	Coal . .	P. L. .	Half a square mile . .	31st March 1890.	6 months.
23. Madras .	Coimbatore (Kollegal Taluk).	W. T. Hamilton Holmes.	Gold and metals other than gold.	P. L. .	848 acres	8th May 1889.	6 months, but subsequently extended to 9 months.
24. Madras .	Nellore .	E. H. Sargent .	Mica . .	M. L. .	10 acres	15th July 1890.	2 years.
25. Madras .	Nellore .	Pillatti Rami Radi and P. Kistnasami Pillai.	Mica . .	M. L. .	10 acres	29th May 1890.	2 years.
26. Madras .	Nellore .	Mahomed Ghouse Moideen Sahib.	Mica . .	M. L. .	5 acres	20th December 1890.	2 years.
27. Madras .	Nellore .	Mahomed Kyrulla Sahib.	Mica . .	M. L. .	1 acre	17th March 1891.	2 years.
28. Madras .	Nellore .	Oosur Narayanappa.	Mica . .	M. L. .	2 acres and 25 cents . . .	2nd April 1891.	2 years.
29. Madras .	Nellore .	Messrs. Kudder Badsha and Hadi Badsha.	Mica . .	M. L. .	4 acres and 20 cents . . .	17th November 1891.	2 years.
30. Madras .	Nellore .	Devarapati Basi Reddi.	Mica . .	M. L. .	8 acres and 66 cents . . .	8th May 1891.	2 years.
31. Madras .	Nellore .	Auchoor Subba Nayadu.	Mica . .	M. L. .	14 acres	28th April 1891.	2 years.
32. Madras .	Nellore .	Yelchoor Lakshmayya.	Mica . .	M. L. .	2 acres and 10 cents . . .	21st April 1891.	2 years.
33. Madras .	Nellore .	Duvour Gobinda Chetty.	Mica . .	M. L. .	3 acres and 80 cents . . .	28th September 1891.	2 years.
34. Madras .	Chingleput District, Conjeevaram and Tiruvallur Taluks.	Arkonam Coal Company (Limited). (Messrs. Leighton & Co.)	Coal . .	P. L. .	2·74 square miles of unoccupied Government waste land scattered in small patches in 34 villages covering a total area of 40 miles.	12th November 1894.	1 year.
35. Madras .	Salem District, Tirupatur Taluk.	Messrs. Arbuthnot & Co., Madras.	Coal . .	P. L. .	148·95 acres of unoccupied Government waste land scattered in small patches in 6 villages.	22nd February 1895.	1 year.
36. Madras .	Salem District, Tirupatur Taluk.	Mr. Charles Kohl of Madras.	Coal and mineral oils.	P. L. .	52·76 acres of unoccupied Government waste land in the village of Kalandira.	22nd February 1895.	1 year.
37. Madras .	Salem District, Tirupatur Taluk.	Mr. Albert Gerdes of Madras.	Coal . .	P. L. .	32·51 acres of unoccupied Government waste land in the village of Aturkuppam.	22nd February 1895.	1 year.
38. Bombay .	Bijapur .	Mr. T. H. Nelson, a retired member of the Madras Civil Service.	Gold, diamonds and other precious stones.	P. L. .	7,029 feet in length, 5,629 feet in breadth.	1st October 1894.	1 year.
39. Bengal .	Manbhum .	Bengal Iron and Steel Company, Limited.	Coal . .	M. L. .	Mauzas Kooltee, Raideeh Chuck Pinjah, Kendwa, and Mahatadeeh.	1st October 1889.	999 years.
40. Bengal .	Darjeeling .	Messrs. Octavius, Steel & Co.	Coal . .	M. L. .	3⅜ square miles or 2,000 acres .	...	20 years.
41. Bengal .	Gangpur State.	Mr. E. G. Barton	Oil, gold, iron and all other metals, ores, and minerals whatsoever (excepting coal).	P. L. .	About 200 square miles . .	1st December 1894.	2 years. *
42. Bengal .	Gangpur State.	Mr. E. G. Barton	Gold . .	M. L. .	About 200 square miles . .	1st February 1894.	30 years.

* During the continuance of this term, the lessee can apply for a mining lease or mining leases not exceeding three in number for working gold, and not exceeding five in number for working any other minerals or oils.

NOTE.—P. L. denotes Prospecting license. E. L. denotes Exploring license. M. L. denotes Mining lease.

NOTE.—Cases Nos. 36 to 38 have been included in the statement, as the applications were made in 1894, though licenses were actually granted in January 1895.

Statement of Mineral grants and licenses made from the year 1889 to 1894 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
43. Bengal .	Kharsawan State, Chota Nagpur.	Kharsawan Gold Syndicate, Limited.	Gold, silver, copper and other metals.	M. L. .	All uncultivated and barren lands, *viz.*, waste lands, nullahs, rivers, and small hills, except cultivated lands in Ramgarh, Handi, Bhaja Putpur, and eleven other mouzas in Kharsawan.	1st July 1890.	20 years.
44. Bengal .	Bonai State	Bengal Gold and Silver Company, Limited.	Gold, silver, lead, copper, iron, coal, etc.	P. L. .	All the waste lands in the State, excepting certain specified tracts.	...	3 years.
45. Bengal .	Bonai State	Bengal Gold and Silver Company, Limited.	Gold, silver, lead, copper, iron, coal, etc.	M. L. .	A block not exceeding 2¼ square miles in one village of the State to be selected during the continuance of the term of the prospecting lease.	...	30 years.
46. Bengal .	Darjeeling.	Finlay, Muir & Co.	Coal and limestone.	P. L. .	4 square miles	...	1 year.
47. Bengal .	Hazaribagh	Messrs. F. F. Christein & Co.	Mica . .	M. L. .	7·1 acres	1st January 1890.	5 years.
48. Bengal .	Hazaribagh	Jankinath Sen .	Mica . .	M. L. .	1·9 poles	1st August 1889.	5 years.
49. Bengal .	Hazaribagh	Jankinath Sen .	Mica . .	M. L. .	5·73 acres	1st August 1889.	5 years.
50. Bengal .	Hazaribagh	Jankinath Sen .	Mica . .	M. L. .	8·99 acres	1st August 1889.	5 years.
51. Bengal .	Hazaribagh	Rajkrishna Sahana	Mica . .	M. L. .	2·68 acres	21st January 1890.	5 years.
52. Bengal .	Hazaribagh	Rajkrishna Sahana	Mica . .	M. L. .	11·9 acres	2nd May 1891.	5 years.
53. Bengal .	Hazaribagh	Ganpat Roy .	Mica . .	M. L. .	1·23 acres	15th November 1890.	5 years.
54. Bengal .	Hazaribagh	Rasik Lal Halder	Mica . .	M. L. .	1·05 acres	29th September 1891.	5 years.
55. Bengal .	Hazaribagh	W. R. Macdonald	Mica . .	M. L. .	5·73 acres	19th September 1891.	7 years.
56. Bengal .	Hazaribagh	W. R. Macdonald	Mica . .	M. L. .	7·61 acres	4th September 1891.	7 years.
57. Bengal .	Hazaribagh	Nand Lal and Rasik Lal Halder.	Mica . .	M. L. .	1·88 acres	16th September 1892.	5 years.
58. Bengal .	Hazaribagh	Mr. W. D. Clyburn	Mica . .	M. L. .	12·8 acres	25th July 1891.	5 years.
59. Bengal .	Hazaribagh	Messrs. F. F. Christein & Co.	Mica . .	M. L. .	29·9 acres	1st October 1891.	5 years.
60. Bengal .	Hazaribagh	Messrs. F. F. Christein & Co.	Mica . .	M. L. .	12 entire villages . . .	1st September 1891.	5 years.
61. Bengal .	Hazaribagh	Rajkrishna Sahana	Mica . .	M. L. .	0·85 acres	15th January 1892.	15 years.
62. Bengal .	Hazaribagh	Shew Nath Ram, transferred to C. A. Dickson, Esq.	Mica . .	M. L. .	5·44 acres	1st January 1892.	5 years.
63. Bengal .	Hazaribagh	W. D. Clyburn, Esq.	Mica . .	M. L. .	1·37 acres	29th April 1892.	5 years.
64. Bengal .	Hazaribagh	Messrs. F. F. Christein & Co.	Mica . .	M. L. .	3 acres	4th January 1894.	5 years.

NOTE.—P. L. denotes Prospecting license. E. L. denotes Exploring license. M. L. denotes Mining lease.

Statement of Mineral grants and licenses made from the year 1889 to 1894 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
65. Bengal	Hazaribagh	Messrs. F. F. Christein & Co.	Mica	M. L.	2·31 acres	4th January 1894.	5 years.
66. Bengal	Hazaribagh	W. R. MacDonald, Esq.	Mica	M. L.	17·48 acres	19th December 1893.	5 years.
67. Bengal	Hazaribagh	W. R. MacDonald, Esq.	Mica	M. L.	1 acre	17th September 1894.	5 years.
68. Bengal	Hazaribagh	W. D. Clyburn, Esq.	Mica	M. L.	·76 acres	4th November 1893.	5 years.
69. N.-W. Provs.	Naini Tal	Lala Krishna Sha, Rai Bahadur.	Sapphires, crystals, rubies, and topaz.	P. L.	276·34 acres	1st January 1893.	1 year.
70. N.-W. Provs.	Naini Tal	North-West Limestone Company. (Colonel Ross, Managing Director.)	Limestone	M. L.	About 73 square miles in the Kumaon Bhabar.	...	10 years.
71. Punjab	See column 6	Punjab Oil Syndicate. (Messrs. McLellan and R. A. and B. T. Townsend.)	Petroleum	P. L.	Throughout the Punjab, north and west of a line drawn from Jummoo to Sialkot, thence following the line of Railway, *viâ* Wazirabad, Lala Musa, Pind Dadan Khan, and Khandian to Khowar and from the last-named place due west to the Western Frontier of the Punjab.	1st January 1891.	3 years.
72. Punjab	Delhi	Zemindars of Arangpur in the Ballabgarh Tahsil.	Crystals	M. L.	Village limit	19th August 1892.	17 years, *i.e.*, for current settlement.
73. Punjab	Kangra	Messrs. McDonald and Farquhar.	Minerals in general.	E. L.	Within the limits of the Waziri-Rupi Jagir.	*	1 year.
74. Central Provs.	Chanda (Cherla Taluk).	Godavari Coal Company. (Messrs. Binny & Co.)	Coal	M. L.	4⅓ square miles	...	20 years.
75. Central Provs.	Narsinghpur (Mohpani).	Nerbudda Coal and Iron Company.	Coal	P. L.	12 square miles	1st August 1893.	1 year.
76. Central Provs.	Narsinghpur (Mohpani).	Nerbudda Coal and Iron Company.	Coal	M. L.	6 square miles	...	...
77. Central Provs.	Jubbulpore.	Medan Koal	Limestone	M. L.	Not known	28th February 1894.	12th October 1894.
78. Central Provs.	Jubbulpore.	Mampher Koal	Limestone	M. L.	Not known	2nd March 1894.	12th October 1894.
79. Central Provs.	Jubbulpore.	Raghu Nath	Limestone	M. L.	Not known	24th March 1894.	12th October 1894.
80. Central Provs.	Jubbulpore.	Mr. Cooke	Limestone	M. L.	1·00	1st October 1894.	1896.
81. Central Provs.	Jubbulpore.	Mr. Cooke	Limestone	M. L.	·75	1st June 1894.	September 1898.
82. Central Provs.	Jubbulpore.	Sheo Narain Bajpai.	Limestone	M. L.	1·00	1st October 1894.	September 1897.
83. Central Provs.	Jubbulpore.	Sheo Narain Bajpai.	Limestone	M. L.	1·00	1st October 1894.	September 1897.
84. Central Provs.	Jubbulpore.	Ganesh Pershad	Limestone	M. L.	1·00	1st October 1894.	September 1896.

NOTE.—P. L. denotes Prospecting license. E. L. denotes Exploring license. M. L. denotes Mining lease.

Statement of Mineral grants and licenses made from the year 1889 to 1894 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
85. Central Provs.	Jubbulpore.	Manak Chand Sookhlal.	Limestone .	M. L. .	1·00	1st October 1894.	September 1897.
86. Central Provs.	Jubbulpore.	Chandidin . .	Limestone .	M. L. .	1·00	1st October 1894.	September 1899.
87. Central Provs.	Jubbulpore.	Chandidin . .	Limestone .	M. L. .	1·00	1st October 1894.	September 1895.
88. Central Provs.	Jubbulpore.	Babu Jadu Nath .	Limestone .	M. L. .	1·00	1st October 1894.	September 1895.
89. Central Provs.	Jubbulpore.	Mr. Dyer . .	Limestone .	M. L. .	1·75	1st October 1894.	September 1895.
90. Central Provs.	Jubbulpore.	Mr. S. G. Cooke .	Limestone .	M. L. .	2·00	1st October 1894.	December 1895.
91. Burma .	Ruby Mines	Streeter & Co. (Ruby Mines Company).	Rubies .	M. L. .	Local areas included in the townships of Mogak, Kyatpyin, and Katha in the Ruby Mines District.	1st November 1889.	7 years.
92. Burma .	Shwebo .	Burma Coal Company (Mr. F. Herrmann).	Coal . .	M. L. .	3 square miles and 350 acres .	1st November 1890.	20 years.
93. Burma .	Upper Chindwin.	Burma Coal Syndicate.	Coal . .	M. L. .	6·66 square miles in the Kale coalfield.	...	50 years.
94. Burma .	Shwebo .	Burma Coal Company.	Coal . .	P. L. .	84 square miles in the Male township.	...	1 year.
95. Burma .	Magwe .	Burma Oil Company (Finlay, Fleming & Co.)	Petroleum .	M. L. .	1 square mile in Yenangyaung (Kodaung grant).	1st January 1890.	20 years.
96. Burma .	Pakôkku .	Burma Oil Company (Finlay, Fleming & Co.).	Petroleum .	M. L. .	66 State wells and the lands known as the Yenankyet State reserve as shown in the plan and schedule.	1st October 1891.	20 years.
97. Burma .	Magwe .	Burma Oil Company (Finlay, Fleming & Co.).	Petroleum .	M. L. .	164 State wells and the several pieces of land adjacent thereto situate in the township of Yenangyaung.	1st October 1891.	20 years.
98. Burma .	Magwe .	Burma Oil Company (Finlay, Fleming & Co.).	Petroleum .	M. L. .	2·824 square miles in Yenangyaung	1st November 1892.	25 years.
99. Burma .	Magwe .	Messrs. Orr, Aria and Borries.	Petroleum .	M. L. .	1 square mile in Yenangyaung .	...	...
100. Burma .	Myingyan .	Messrs. Orr, Aria and Borries.	Petroleum .	M. L. .	1·06 square miles in Yenangyaung	...	
101. Burma .	Myingyan .	Deacon Syndicate.	Petroleum .	M. L. .	3·72 square miles in Yenangyaung	...	25 years.
102. Burma .	Minbu .	Buckland Syndicate.	Petroleum .	M. L. .	1·55 square miles in Yenangyaung	...	
103. Burma .	Minbu .	Burma Oil Company.	Petroleum .	M. L. .	1 square mile . . .	1st April 1893.	25 years.
104. Burma .	Katha .	Mr. C. M. P. Wright.	Minerals or mineral oil.	E. L. .	Wuntho Sub-division . . .	13th Jan. 1893.	1 year.

NOTE.—P. L. denotes Prospecting license. E. L. denotes Exploring license. M. L. denotes Mining lease.

Statement of Mineral grants and licenses made from the year 1889 to 1894 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
105. Burma .	Katha .	Mr. S. Von Kottwitz.	Minerals or mineral oil.	E. L. .	Pinlebu Sub-division . . .	29th March 1893.	1 year.
106. Burma .	Mergui .	Captain Menzell .	Tin and other minerals and mineral products.	P. L. and M. L.	Maliwun township . .	1st November 1892.	P.L. 5 years, then M. L. 21 years.
107. Burma .	Bawzaing State in the Southern Shan States.	Saw Ho Shoke .	Lead . .	M. L. .	Area 4½ square miles . . .	1st October 1892.	5 years.
108. Burma .	Kyaukpyu .	Naga Ni Ye .	Petroleum .	M. L. .	1 acre	12th March 1894.	10 years.
109. Burma .	Kyaukpyu .	Wapa Sayapu .	Petroleum .	M. L. .	0·90 of an acre	9th May 1894.	10 years.
110. Burma .	Kyaukpyu .	Maung Pan Hla .	Petroleum .	M. L. .	27·23 acres	12th June 1894.	30 years.
111. Burma .	Kyaukpyu .	Maung Tun Hla .	Petroleum .	M. L. .	5·24 acres	12th June 1894.	30 years.
112. Burma .	Kyaukpyu .	Ma Ko . .	Petroleum .	M. L. .	0·73 acres	15th June 1894.	30 years.
113. Burma .	Kyaukpyu	Maung Yan Aung Ma E Bon . . Ma Shwe Bon . Ma Mya Nagon .	Petroleum .	M. L. .	4·98 acres	29th September 1894.	30 years.
114. Burma .	Kyaukpyu .	Arakan Petroleum Company, Limited.	Petroleum .	M. L. .	25·53 acres	18th October 1894.	30 years.
115. Burma .	Kyaukpyu	Mr. R. S. Dunlop.	Petroleum .	M. L. .	18·80 acres	18th October 1894.	30 years.
116. Burma .	Kyaukpyu .	Ma Mya . .	Petroleum .	M. L. .	2·23 acres	3rd November 1894.	30 years.
117. Burma .	Kyaukpyu .	Nga Kyaung She.	Petroleum .	M. L. .	0·50 acres	19th December 1894.	10 years.
118. Burma .	Tavoy .	Mr. J. D. Watson.	Gold . .	P. L. .	400 acres in the Central township .	2nd January 1894.	1 year.
119. Burma .	Tavoy .	Mr. J. D. Watson	Gold . .	P. L. .	178 acres 9 annas in the Central township.	2nd January 1894.	1 year.
120. Burma .	Katha .	Mr. C.M.P. Wright	Gold . .	P. L. .	1 square mile at Mandaw, Kawlin Sub-division.	4th April 1894.	1 year.
121. Burma .	Katha .	Mr. C.M.P. Wright	Gold . .	P. L. .	1 square mile within the Mawnaing township, Kawlin Sub-division.	6th April 1894.	1 year.
122. Burma .	Katha .	Mr. C. Vetter .	Gold . .	M. L. .	1 mile by ¼ mile, Mawnaing circle, Mawnaing township.	1st August 1894.	30 years.
123. Burma .	Katha .	Mr. H. Ascher .	Gold . .	M. L. .	1 mile by ¼ mile, Leiksaw circle .	1st August 1894.	30 years.
124. Burma .	Katha .	Mr. Fritz Eggena.	Gold . .	M. L. .	1 mile by ¼ mile, Mawnaing circle, Mawnaing township.	1st August 1894.	30 years.
125. Burma .	Katha .	Messrs. Hegt and Company, Rangoon.	Gold . .	P. L. .	1 square mile, Banmauk township .	1st October 1894.	1 year.
126. Burma .	Katha .	Messrs. Hegt and Company, Rangoon.	Gold . .	P. L. .	1 square mile, Mawnaing township	1st October 1894.	1 year.

NOTE.—P. L. denotes Prospecting license. E. L. denotes Exploring license. M. L. denotes Mining lease.

Statement of Mineral grants and licenses made from the year 1889 to 1894 inclusive—concluded.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
127. Burma .	Thayetmyo	Messrs. Lewis and Hulberts.	Coal .	M. L. .	960 acres opproximately . .	2nd November 1894.	Not known
128. Burma .	Pakôkku .	Burma Oil Company.	Petroleum .	P. L. .	3 square-miles	May 1894 .	1 year.
129. Burma .	Magwe .	Burma Oil Company.	Petroleum .	M. L.	3 square miles	1st August 1894.	25 years.
130. Burma .	Mandalay .	Mr. F. C. Kennedy. C.I.E., Manager. Irrawaddy Flotilla Co., Ld.	Precious stones other than rubies.	P. L. .	1 square mile	10th August 1894.	1 year.
131. Assam .	Lakhimpur	Messrs. J. Alston and W. E. Goodfellow.	Gold . .	E. L. .	Tippam Hills	29th August 1892.	1 year.
132. Assam .	Lakhimpur	Mr. W. E. S. Jefferson.	Gold and precious stones.	P. L. .	Within 100 feet of the banks of the rivers of North Lakhimpur.	23rd May 1892.	1 year.
133. Assam .	Sibsagar .	Mr. T. H. Trottman.	Gold and precious stones.	P. L. .	Within 100 feet of the banks of certain rivers in the district of Sibsagar.	1st April 1893.	1 year.
134. Assam .	Khasi and Jaintia Hills	Mr. Oswin Weynton.	Petroleum .	M. L. .	4 square miles	...	20 years.
135. Assam .	Lakhimpur	Assam Railways and Trading Company.	Petroleum .	M. L. .	4 square miles	1st January 1892.	25 years.
136. Assam .	Lakhimpur	Assam Oil Syndicate.					
137. Assam .	Naga Hills	Assam Tea Company.	Coal . .	M. L. .	Naga Hills as shown in the schedule attached to the lease.	28th February 1891.	10 years.
138. Assam .	Khasi and Jaintia Hills	Messrs. Kilburn & Co.	Coal . .	E. L. .	Langrin coal-field, as shown in schedule attached to the license.	4th July 1892.	2 years.
139. Assam .	Khasi and Jaintia Hills.	Messrs. Kilburn & Co.	Coal . .	P. L. .	6 square miles in the Langrin coal-field.	(*b*)	1 year.
140. Assam .	Sylhet .	Mr. H. A. Brown-Constable.	Coal . .	P. L. .	$2\frac{1}{16}$th square miles in the Patharia Hills.	5th October 1893.	1 year.
141. Assam .	Lakhimpur	Messrs. A. W. Madden and C. F. Strangways.	Gold and precious stones.	P. L. .	Within 100 feet of the banks of the rivers of North Lakhimpur.	1st November 1893.	1 year.
142. Assam .	Khasi and Jaintia Hills.	Mr. R. R. Waller, 5 Lyon's Range, Calcutta.	Coal . .	M. L. .	345 acres in the Lakadong Delloiship, Jaintia Hills.	1st July 1894.	30 years.
143. Assam .	Lakhimpur	Messrs. A. W. Madden and C. F. Strangways.	Gold and precious stones.	E. L. .	Within 100 feet of the bank of the river Dehing, Noadeling, and Buridehing, all their tributaries, chiefly the Tingrai, Tipling, Thangrang. Digboi, Pawai, Jangiri, Namrúp, Tirap, Namdnág, Makum pani, and Namsáng.	5th July 1894.	1 year.
144. Assam .	Lakhimpur	Messrs. A. W. Madden and C. F. Strangways.	Gold and precious stones.	P. L. .	Ditto ditto ditto .	12th July 1894.	1 year.
145. Rajputana	Ulwar State	Rajwade Glass Manufacturing Company, Limited.	Lime stone, quartz, flint, and crystals.	M. L. .	Certain local areas noted in the schedule attached to the lease.	1st January 1892.	25 years.

NOTE.—P. L. denotes Prospecting license. E. L. denote Exploring license. M. L. denotes Mining lease.

G. I. C. P. O.—No. 317 R. & A.—17-12 95.—670.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE AND AGRICULTURE.

REVIEW

OF

MINERAL PRODUCTION IN INDIA

FOR

1895.

GEORGE WATT, M.B., C.M., C.I.E.,

REPORTER ON ECONOMIC PRODUCTS TO THE GOVERNMENT OF INDIA.

Published by order of the Governor General in Council.

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Statement I.

(*For the Review of Statement II. see page 35.*)

THE MORE IMPORTANT MINERALS.

I.—SALT (*Namak, Hind.*).

SALT:

1.—PRODUCTION OF SALT IN INDIA.

PRODUCTION.

The information tabulated on page 64 will be found to manifest a decrease in this year's production of salt which amounts to **14·97 per cent.** on the outturn of the previous year. A comparison of the present returns, however, with the average of the past three years, shows the production to manifest an expansion of 9·07 per cent. The obvious explanation of these facts is that the manufacture of salt from the lakes and estuaries of India is dependent to a large extent on the favourableness or otherwise of the season. In good years a far larger amount is made than is actually required, and the surplus is stored against a season when it might not be possible to manufacture sufficient to meet actual consumption. The production last year came to **1,103,130** tons against **1,297,378** tons in 1894.

II.—SOURCES OF SUPPLY, METHODS OF MANUFACTURE, AND PRICE OF PRODUCTION.

1. There are four chief sources of salt supply: (*a*) Evaporation salt from the lakes and pits of Rajputana; (*b*) Evaporation salt obtained directly or indirectly from the sea; (*c*) Rock salt of the Panjab; and (*d*) Foreign salt imported into India. The table, para. 32, gives the total production for the past five years.

The administration of the Salt Revenue may be said to be vested in five offices as follows:—(1) the Commissioner of Salt Revenue, Northern India; (2) the Board of Revenue, Bengal; (3) the Collector of Salt Revenue, Bombay; (4) the Collector of Salt Revenue, Sind; and (5) the Board of Revenue, Madras. It may serve a useful purpose to give very briefly an account of the sources of supply in relation to the administrative organisation.

2. ***NORTHERN INDIA.***—The EVAPORATION salt of Rajputana is derived from the Sambhar lake, the Didwana lake, and the Pachbadra pits.

NORTHERN INDIA.

Sambhar.

The ***SAMBHAR*** lake is by far the most important. It is situated on the borders of the Jaipur and Jodhpur States. It is a shallow sheet of water which measures 20 miles in length and averages from 2 to 7 miles in breadth, but contains when full only some one to four feet of water. The salt obtained is of very high quality and is consumed throughout the North-West Provinces and Oudh, Rajputana and Central India. The working season ordinarily is from November to May, but it varies greatly according to the character and extent of the previous rains. It is this circumstance mainly that accounts for the extreme fluctuations shown in the returns of production. The lake is leased by Government from the Jaipur and Jodhpur States for ₹7,00,000 with, in addition, a royalty of 40 per cent. of the price of salt sold in excess of 63,135 tons. The royalty may be said to add, on an average, the further payment of ₹2,00,000 a year.

Three descriptions of salt are made at Sambhar, *viz.*, (*a*) *Kyar* salt produced in permanently walled compartments within the lake; (*b*) pan salt made in shallow basins constructed along the shores of the lake; and (*c*) lake salt, that is, salt that forms spontaneously in the bed of the lake as the water evaporates, and without any assistance except light screens run out to retain the brine within selected areas, in other words to prevent its receding into the distant central basin.

(*a.*) The object of the formation of permanent walls (*kyars*) is to allow of manufacture at times when extraction by other processes would be impossible, owing to there being either too much or too little brine. There are ten *kyars* in operation, sub-divided into pans about two feet in depth by a pathway running between. The supply of brine is regulated as desired. Soft earth is carefully removed from the pans, in order that the deposit of salt may be as clean as possible. The salt produced is accordingly of excellent quality and is formed into large crystals. In good years the produce of *kyar* salt amounts to over **36,600 tons.**

(*b.*) The pan salt, produced on the shore of the lake, is superior to that formed naturally but inferior to *kyar* salt. It is small in grain and the crystals are badly formed. The pans are constructed of the clay of the soil and they last for only one season. They are scattered along the shore for a distance of 20 miles, and as the water of the lake recedes fresh pans have to be made further and further in. They are fed by trenches from the deeper water. The brine is raised from the trenches or reservoirs by hand pumps or by baskets lined with leather. These are swung by two men who stand on either side of the trench and hold the ropes attached to the baskets. The brine is scooped out as it were and thrown to the higher level. In a fair average season the quantity of salt, made in this way, comes to about **91,500 tons.**

SALT: PRODUCTION.

NORTHERN INDIA: Sambhar.

(*c*.) The naturally formed salt amounts to about 36,600 tons. The highest record of total production at Sambhar was in 1883-84 when 260,276 tons were turned out, and the lowest 1892-93, *viz*., 3,318 tons. The former was an abnormally favourable and the latter an abnormally unfavourable year. An average year might be put at **146,000 tons.** In 1892-93 the rainfall came to 41 inches, or about 15 inches over the highest record. The prevailing wind was also easterly and damp. Crop after crop of salt as it formed was again destroyed by the showers that fell throughout the year. The liability, therefore, to fluctuations such as indicated necessitates large storage. In favourable years no opportunity is lost to advance production. When the year 1883-84 opened there was a balance of salt in store at Sambhar of 166,358 tons. The manufactures of that year came to 260,276 tons and the sales were 134,738 tons. When 1892-93 closed, the year of lowest recorded production, the sales had been 187,011 tons, but the surplus stock even then came to 10,326 tons. These figures illustrate the balance usually preserved by storage on fluctuations of production. The table, para. 32, gives the total production during the past five years.

The actual cost of production and storage is only about 6 pies per maund, but on adding the cost of establishment and supervision, rent of the source, royalty on sales and all other petty charges, it comes to 3 annas and 8·46 pies a maund. The average price obtained for the salt sold at the source may be put at 4 annas and 0·11 pies per maund.

Didwana.

3. The ***DIDWANA SALT*** is derived from a small lake about three miles long and one mile broad. It belongs to the Jodhpur State, but is leased by the Government of India for ₹2,00,000. The working season extends from February to the commencement of the rains. The average production at Didwana during the past ten years has been **13,183 tons.** The average cost of actual production and storage comes to a trifle over six pies per maund, but if to this be added supervision, rent and all other charges, the net cost of production comes to 2 annas 9·32 pies per maund.

Pachbadra.

4. The ***PACHBADRA.***—This source of supply has been leased by Government from the Jodhpur State for ₹1,70,000 a year. The salt is procured from pits dug within what might be described as a former river bed. The area over which the works extend is about six by two and a half miles. The salt is known by the names of the three working sections, *viz*., Sambra, Hiragarh and Pusali. Sambra salt is of the best quality and forms into larger crystals than the salt of the other two sections. The pits are sunk in clay soil, those in Hiragarh and Pusali being in more sandy soils. There is practically no working season at Pachbadra, salt may be obtained any time, except during heavy rains or sand storms. The average annual production during the past ten years has been **21,386 tons.** The cost of production comes usually to 3 annas 3·91 pies a maund.

Rock Salt.

5. The ***ROCK SALT*** of Northern India is excavated from, 1st, the salt mines of the Salt Range which extend for 152 miles from the Jhelam to the Indus; 2nd, the salt mines of Kohat (trans-Indus); and, 3rd, the Himálayan salt mines of the Mandi State. The first may be spoken of as the salt mines of the Panjab. They consist of the Mayo mines in the Jhelam district; the Warcha mines in the Shahpur district; and the Kalabagh mines of the Bannu district.

Mayo Mines.

The ***Mayo Mines*** are said to have five workable salt seams, with an aggregate thickness of fully 275 feet and between these marl and unworkable salt to the extent of *other* 275 feet. The mines open into the Khewra gorge and are entered by a tunnel along which a tramway is laid. Operations are carried from the roof downwards passing through the strata. The salt is obtained by pick and blast in the usual way with all mining operations. The chambers thus excavated are separated by walls of salt 25 to 30 feet in thickness. Some of these chambers measure 250 feet long by 45 feet wide and 200 feet in height. It has been stated, in a criticism on the wisdom of treating salt, "technically a mineral," as such, that "a salt merchant may be called a dealer in minerals, but a gold miner would repudiate the idea, and a diamond merchant would utterly scout it." The salt mining operations of the Panjab compare not unfavourably even from an engineering point of view, with either the gold or the coal mining of other provinces. They give employment to about 700 miners. The supply is inexhaustible and is liable to little or no interruptions. The output is entirely dependent on demand. Since the opening of the Sind-Sâgar State Railway and the bridging of the Jhelam at Chok Nizam the trade with the North-West Provinces has been greatly expanded, and yearly increasing supplies are being sent even to Patna and Gya in Behar, thus to a certain extent penetrating into the area formerly exclusively held by European salt. The salt obtained from these mines is of a very pure quality, as much as 97 to 98 per cent. being sodium chloride. The average production during the past ten years has been **71,660 tons,** but the output first exceeded that average in 1889-90 and has never materially fallen below it, so that it may be regarded that distinct indications of an increasing demand have been established. The table, para. 32, gives the actual production of rock salt during the past five years. Mayo mines salt landed at the depôt may be said to be produced at 8 pies per maund, or, say, R1-3 per ton.

Warcha Mines.

6. The ***Warcha Mines*** are similar, though on a smaller scale, to the Mayo, and the ***Kalabagh, Kohat,*** and ***Mandi*** would more correctly be described as quarries than mines. The quantity of Salt at Kohat is absolutely inexhaustible. At Bahadur Kheyl, for example, the all but naked salt is four miles long and averages a quarter of a mile wide with some of the visible salt strata over 1,000 feet in thickness. It has been estimated that the Kohat salt comes to over 150 millions of tons.

Brine-Wells, Sultanpur.

7. ***SULTANPUR.***—Lastly in the Panjab, over a tract of country of some 15 square miles in extent, that lies south-west of Delhi, salt is obtained from brine wells. This is known as Sultanpur salt from the name of the chief village. It is, however, of very inferior quality though of good colour, is small grained and bitter to taste, owing to the presence of sodium sulphate. It cannot compete with Sambhar salt being badly and

expensively worked over and above its inferior quality. The cost of production, exclusive of interest on borrowed capital, comes to about 2⅔ annas per maund. It is consequently gradually disappearing from trade. The season of production is from October to June.

BENGAL:

8. ***BENGAL.***—There is practically no salt manufactured in Bengal, the small quantity produced in Orissa being under the administration of the Madras Salt Department. (*Conf. with paras. 14 and 23.*)

Foreign Salt.

FOREIGN SALT.—The first recorded imports of foreign salt were in 1818-19, but the quantity remained small until 1835-36. The old stocks of salt manufactured at the Government agencies were exhausted in 1873-74 since which date the consumption over the whole of Bengal has been entirely met, or practically so, by foreign salt. Bengal salt supply at the present day is imported by Calcutta and Chittagong. The other ports that show imports of salt (Chandbali and Narainganj) deal with coastwise traffic from Calcutta or Chittagong. The consumption of imported salt has increased enormously as may be seen from the following returns :—

	Tons.	Percentage increase on figure above.
1852-53 . . .	104,445	—
1862-63 . . .	243,639	133·27
1872-73 . . .	262,190	7·61
1882-83 . . .	309,124	17·90
1892-93 . . .	343,429	11·10
1893-94 . . .	379,238	10·43
1894-95 . . .	470,818	24·12

In some respects it may be said foreign salt does not at present compete with Indian production. It simply has possession of Bengal and Burma, while Indian salt similarly holds the other markets. Railway freight is the governing factor, Calcutta being remote from the seats of production. India possesses in the Salt Range alone enough salt to meet the demands of the whole world, but the sea freights from Europe are less than the railway charges from the mines or from the salt-yielding lakes and estuaries.

The quantity of salt imported to a very large extent is dependent on the freights ruling; if high, a decrease of imports occurs, the reverse being the case when a dearth prevails in other cargoes. Salt is brought to India by many "liners" especially those sailing from Liverpool, and by special vessels chartered for the jute trade which carry out salt practically as ballast. "Tramps" also occasionally bring coal to Port Said and then come on to India with salt from Ras Rowaya and Aden. Under paragraph 34 other particulars of the total imports to all India of foreign salt will be found. The present remarks refer to the supply drawn by Bengal. And it may be added by way of concluding this section that the opening of the East Coast Railway will bring Calcutta into comparative easy touch with an important area of sea-salt production which is capable of considerable expansion. The future may thus be looked to as possibly likely to show direct competition of Indian with foreign salt.

Aden.

Descriptions.

The various classes of salt commonly imported into Calcutta may be grouped as follows :—

Manufactured by solar evaporation : Bombay, Madras, Ceylon, Jeddah, Muscat, Aden, Italy and [France.

Manufactured by boiling : Liverpool and Hamburg.

Rock Salt: Muscat.

BOMBAY:

9. ***BOMBAY.***—The salt consumed in the Western Presidency may be said to be of three kinds: (*a*) Baragara salt; (*b*) Sea salt; and (*c*) Imported salt.

Baragara.

(*a*) ***BARAGARA SALT.***—This is manufactured from sub-soil brine at two centres six miles apart, namely, Kharaghora and Udu on the borders of the Lesser Runn of Cutch. The land belongs to Government, and the salt is manufactured on Government account by men who are paid a fixed rate for salt that comes up to standard. This form of salt occurs in large cubical crystals from half to three quarters of an inch in diameter, each of which is built up of a number of smaller crystals. It is extremely hard and can be sent to great distances with remarkably little loss. The average quantity produced within the past five years has been 66,652 tons.

Sea-Salt.

10. (*b*) ***SEA-SALT.***—With the exception of four small groups of works all the sea-salt works in the Presidency are located within a radius of 30 miles around the city of Bombay, and mainly in the Thana district. Practically all these works are owned by private individuals. Even the Government works are farmed out to persons who manufacture the salt on exactly the same conditions as the owners of private concerns. It may consequently be said that in Bombay the manufacture of salt is entirely a private industry conducted under license. (*Conf. with paras. 15, 25 and 33.*) The salt made is the property of the licensee, the price being fixed in the open market. There are no restrictions of any kind. The functions of the Salt Department are the safe custody of the salt produced (none can be removed except under permit) and the collection of duty on salt when removed.

The site chosen for a salt-works is usually on the shore of a creek or estuary, below the level of high tides and fully exposed to the influence of the prevailing winds. It is first surrounded by high embankments, the enclosed space being perhaps 250 by 80 feet. The space so enclosed is then divided by other walls

SALT: PRODUCTION. BOMBAY:

into three sections—the outer reservoir, the inner reservoir, and the pan area. The space devoted to pans is carefully levelled and a floor of clay repeatedly puddled until it becomes water-tight. The pans are formed by small clay partitions two feet broad which run the whole length and breadth of the pan area, crossing each other at right angles and thus forming a number of rectangular crystallising beds. The size of the beds vary, but 18 to 10 feet are common. The levels are so arranged that the water flows from the first reservoir into the second and from the second into the pans, being gradually concentrated as it flows from one basin to another. The water from the sea is admitted through a sluice and is thus exposed to evaporation till it forms brine. With this brine the pans are charged, to a depth of an inch and half, and within a few hours in favourable weather, especially on shallow pans, a layer of crystals is formed, generally about one quarter of an inch in thickness. The salt is then racked on to the ridges and left to dry, and the pans are recharged.

Bombay sea salt is composed of small crystals about one-eighth of an inch in diameter, but fine grain salt (the siftings and sweepings of the pans) is exported to Calcutta and the drift or flake salt—an excellent quality and whiteness—is reserved for the Bombay market. The season of production is from March to June. It varies however very greatly with the weather—cloudy sky and a low temperature during the hot weather, retard evaporation and diminish the outturn. Unseasonable rain may stop manufacture entirely. The outturn depends in fact more on the date when the rains set in than on anything else. If the rains are late the crop is a large one. In well-conducted works the cost of production is 6 pies per maund, the average is probably 9 pies. The table, para. 32, gives the total production of salt in Bombay during the past five years.

Imported.

11. (*c*) ***IMPORTED SALT.***—This to a very small extent consists of European table salt. The manufacture of sea-salt in Bombay and Madras demonstrates what India can do in competition with foreign imports. The case of Calcutta is doubtless different in many respects from that of Bombay, its distance from the sea being an important factor in the existence of a large import trade in foreign salt. The chief imports into Bombay are coastwise and by road. During the past three years the total imports have been in 1892-93, 8,635 tons, in 1893-94, 9,303 tons, and in 1894-95, **11,413 tons.** Since the termination of the Goa treaty large quantities of salt have been drawn from that State to meet the necessities of the Southern Maratha country and part of Madras Presidency. This salt is sea-salt of good quality closely resembling Bombay salt. Sind and the Persian Gulf ports also furnish Bombay with a quota of its salt.

SIND:

12. ***SIND*** has three main sources of supply, *viz.*, (*a*) Maurypur, (*b*) Sáran; and (*c*) Dilyár.

Maurypur.

(*a*) ***MAURYPUR*** works are similar to those near Bombay. The salt is manufactured from sea water. This supplies the greater part of Sind, a very considerable portion being issued from the depôt at Sukkur. The works are situate on the Moach plain about seven miles west of Karachi. The water is let into the works by a channel leading from the harbour. Salt is manufactured all the year round except when it rains.

At Sirganda on the Kori mouth of the Indus (adjoining the Runn of Cutch) vast deposits of salt exist, but these are not worked.

Saran and Dilyar.

13. (*b*) and (*c*) the ***SARAN*** and ***DILYAR*** salt deposits are lakes from which the salt is obtained on the evaporation of the water by a process exactly similar to that in Rajputana. This salt is sold to the people of Thar and Parkar, and the Hyderabad districts. Operations are generally conducted during the cold weather when the water is at its lowest level.

The total production of Sind usually averages a little over **10,000 tons** (*See para. 32*). The cost of production and storage of salt in Sind has been put at 15 pies per maund at Maurypur, and 9 pies at Sáran and Dilyár.

MADRAS:

14. ***MADRAS.***—Salt is obtained in this Presidency exclusively by evaporation in salt works known locally as factories. The factories of the west coast have for some years been abandoned, as neither the soil nor the climate were favourable for salt manufacture. On the east coast there are about 80 factories which cover an area of 13,800 acres. Spontaneous salt is also collected at a few localities, such as Panchakali in the Tinnevelly district; Vedaranniyam in Tanjore; and Pandraka in Kistna. Pandraka salt is heavy and pure. It is not used in the Presidency but is exported to the Nizam's Dominions. The manufacture of earth salt and salt from saltpetre has since the Act of 1882 been almost entirely abandoned. From 1802 down to 1882 the private manufacture of salt was prohibited, but since about 1886 private manufacture has greatly increased. This is permitted under an excise system, Government in many cases having leased their factories to private parties. (*Conf. with paras. 10 and 23.*)

The system pursued in making salt from sea water is very similar to that briefly indicated above in connection with Bombay and Sind. The sea water is allowed to flow into great shallow basins where evaporation takes place, the brine being at the same time made to flow from successive basins until it reaches the final evaporating pans. There are two modifications, however, of the pans, one in which each flow is allowed to evaporate and is then scraped out; the other in which successive flows of brine are evaporated, one on the top of the other, until the pans are practically full of layer upon layer of salt.

The season of production varies in the different factories according to the period of rainfall. In the four most northern districts with a strong south-west monsoon, manufacture rarely extends into July. In Nellore owing to the rains of June and July being only slight, manufacture is continued up to August and sometimes even September. In the Chingleput, South Arcot and Tanjore districts, manufacture usually closes in September, while in Madura and Tinnevelly it continues to October and even November.

The season of commencement of operations similarly varies according to the period of heaviest rainfall

and amount of the rains. In the northern districts salt even begins to form in November, to the south not till December or even not before March.

There has recently been a slightly increased production in Orissa, on the part of Government. The salt is made in pans by sun-drying at two factories, *viz.*, Gurubai and Tua on the Chilka lake. The total cost of production at the Government factories in Orissa has been put at 3 annas a maund. (*Conf. with para. 8.*)

The average annual production at the east coast factories for the past ten years has been 298,800 tons, but the demand for this salt has given indications of a uniform and steady improvement. The average production for the five years ending 1886-87 came to only 224,600 tons. The actual production for the past five years will be seen in the table, para. 32.

15. In a recent official publication (*Systems and Practice of Salt Administration in India*, freely consulted in the preparation of this review) it is pointed out that "Under the excise system Government has no control over the extent of the manufacture. The interest of the licensees, and of the middlemen into whose hands they have fallen, are opposed to the maintenance of large stocks, as there is less loss from wastage if stocks can be disposed of without loss of time. It is no part of their business to provide against scarcity of salt and they therefore manufacture only as much salt as may suit their interest, and no more." "The success or failure of salt manufacture is, however, chiefly dependent on the state of the season: if rains are untimely or heavy, manufacturing operations must of necessity be poor, while a continuous dry season is favourable for salt manufacture."

In 1881-82 the net cost of salt came to 2 annas 4·3 pies a maund, but in subsequent years the cost of the Government salt under the monopoly system rarely exceeded 2 annas. As regards excise (the report above quoted states that) it is difficult owing to the want of particulars to say what the cost is. In most factories it must in recent years have been considerably under 2 annas a maund. "In introducing the excise system it was expected that a diminution in cost would be effected by competition amongst the manufacturers, but the tendency has everywhere been towards *combination* rather than *competition*." "Of late, however, notwithstanding the handsome remuneration paid by capitalists, there has been a gradual increase in the number of independent licensees, who show a growing tendency to free themselves from the control of capitalists." (*Private Enterprise—Conf. with paras. 10, 25, 29, and 33.*)

16. ***BURMA.***—To the above statement of the salt supply of India may be added very briefly some particulars as to Burma. Throughout both Upper and Lower Burma salt is manufactured from brine impregnated earth and at Amherst from sea water. The rate of taxation is regulated in direct relationship to the duty on foreign imported salt. The amounts manufactured by private persons holding licenses were during the past three years as follows:—13,234 tons in 1892-93; 17,516 tons in 1893-94; and 19,245 tons in 1894-95. The relative importance, however, of this industry to that in imported foreign salt may be shown by the following figures of the imports in 1892-93 (foreign 34,665 + coastwise 2,052) 36,717 tons; in 1893-94 (foreign 47,492 + coastwise 1,651) 49,143 tons; and in 1894-95 (foreign 48,442 + coastwise 2,717) 51,159 tons. It will, however, be observed that local production continued to expand in the face of these imports and that the returns of this year show, on those of 1894, 9·87 per cent. increase, or on the average of the three preceding years 35·19 per cent.

III.—AREAS OF CONSUMPTION.

CONSUMPTION.

The particulars dealt with in the foregoing remarks may be accepted as denoting the chief seats of supply or production. It may now serve a useful purpose to denote the markets or areas within which the various classes of salt are distributed. In dealing with this section opportunity will be taken to exhibit certain details of the returns of trade for the year under review.

NORTHERN INDIA SALT: Sambhar.

17. ***NORTHERN INDIA SALT.—SAMBHAR SALT*** is more extensively used than any other over the greater part of the North-West Provinces, Oudh and Rajputana. It also penetrates into the south-eastern districts of the Panjab (bordering Rajputana); into Central India; and into a portion of the Central Provinces. In the north-and north-west it meets in the cis-Indus districts of the Panjab, the Rock Salt of that area and in the direction of Bengal, it overlaps the region of the imported foreign salt of the Lower Provinces. Towards the south of Rajputana and, south and south-east of Central India it comes into conflict with Pachbadra salt and with the Barágara salt of Bombay. Similarly in the Central Provinces it is found to be gradually contesting the markets with Pachbadra, Barágara and Konkan salt.

Owing to the heavy sales of Sambhar salt in 1890-91, 1891-92, followed by the bad manufacturing season but continued high demands of 1892-93, the reserve stocks were overdrawn. To check this the price of Sambhar salt had to be raised and the demand in 1893-94 (as was intended it should) naturally declined. But the year 1893-94 proved a remarkably good manufacturing one and hence relative to 1892-93 the production manifested an almost unprecedented expansion. Sambhar salt was, however, temporarily displaced from portions of its natural area by Didwana, Pachbadra and even by Barágara. The last mentioned, fostered by the high prices demanded for Sambhar salt, found its way to a much greater extent than ordinarily into the districts of the North-West Provinces. The rock salt of the Panjab manifested little, if any, benefit by the opening afforded through the high prices that ruled for Sambhar salt. This illustration only serves, therefore, to demonstrate the mutual adjustments that at once take place should the necessary production in any one of the important centres be prevented.

Pachbadra.

18. ***PACHBADRA SALT.***—The area over which this salt formerly penetrated was very much greater than at present. It has been restricted through the greater facility of producing cheap salt at Sambhar. Its present markets may be said to be Udaipur, Bhopal and Ságar.

Didwana.

19. ***DIDWANA*** in normal years supplies Rohtak, Hissar, Delhi and the Karnal districts of the Panjab and Mozaffernagar, Saharanpur, Mérut and Balandshahr of the North-West Provinces.

SALT: CONSUMPTION. NORTHERN INDIA:

20. THE *ROCK SALT* of the Panjab practically supplies the whole cis-Indus districts of that province, north of the area of Didwana salt, and extends into Kashmir on the one side, Bahawalpur on the other. Throughout Kangra and Simla and portions of the adjacent districts Mandi salt is almost exclusively used. To the west the Indus forms a sharply dividing line, Kohat salt meeting all the demands of the Trans-Indus tract.

Traffic in

21. ***Traffic in the Salt of Northern India.***—The following statement shows the production of salt during the past five years in the chief centres of this area:—

Northern India Production of Salt.

	1891.	1892.	1893.	1894.	1895.
	Tons.	Tons.	Tons.	Tons.	Tons.
Sambhar	79,134	42,716	70,992	277,974	196,727
Other Rajputana Salt	23,905	21,818	11,821	61,377	51,997
Rock Salt	103,909	91,944	97,091	96,837	96,471
TOTAL	206,948	156,478	179,904	436,188	345,195

The above return purposely leaves out of account Mandi salt, Sultanpuri salt and the small amount of salt obtained as a by-product in the purification of saltpetre.

The statement of Rail-borne Traffic (Appendix, *pages 70-73*) will be seen to exhibit the movements of salt of all kinds within India. From what has been already stated it may readily be admitted that the exports from Rajputana and the Panjab can with safety be accepted as drawn from the sources indicated above. During the year under review, Rajputana exported in all 117,068 tons of salt. The major portion of this went to the North-West Provinces (*viz.*, 88·63 per cent.) and very much smaller quantities to the Panjab and the Central Provinces. The Panjab exported only 14,940 tons, the bulk of which also went to the North-West Provinces with considerable quantities to Bengal and the Central Provinces.

The balance over these returns of exports of the figures of production may, for all practical purposes, be regarded as representing local consumption and surplus stock.

BENGAL: Foreign Salt.

22. ***BENGAL.***—As already indicated, the whole of Bengal proper, including Behar and rather more than half of Cuttack, are supplied by imported, mostly foreign, salt. This meets the Chilka lake salt and the sea salt of Ganjam in Orissa, the Rock salt of the Panjab in Behar, and, passing across the geographical limits of Bengal, it also contests the markets of Sambhar salt in the frontier districts of the North-West Provinces. It penetrates into Nepal, Sikkim, Bhutan, and after supplying the wants of all the districts of Assam it overflows into the hill tracts on the north-eastern frontier. From Chittagong it is carried to the Lushai country and even across the frontier into the adjacent mountain tracts of Burma.

Traffic in

23. ***Bengal Traffic in Salt.***—To obtain some conception of the Bengal traffic in salt it is necessary to tabulate the quotations of imports and exports by sea and land. The returns of the Rail and River-borne Trade show an export (*page 11*) during the past year of **326,455 tons** from Calcutta, the major portion of which (89·96 per cent.) went to the Bengal Province. The exports from the Province are unimportant and may be disregarded. Last year they came to only 3,136 tons consigned to Assam, the North-West Provinces and Calcutta. Assam draws its chief supply from Calcutta, and last year this came to 21,055 tons with 1,872 tons from the Province of Bengal. The North-West Provinces took 11,663 tons from Calcutta and very much smaller quantities went to the Central Provinces and even to the Panjab. The imports into Calcutta by rail were unimportant (60 tons) and the Province drew, as has been already stated, 2,505 tons from the Panjab, chiefly, no doubt, rock salt.

The bulk of the Bengal supply is of course derived from foreign countries. The returns given above (*page 3*) show a remarkable expansion in this traffic from 104,445 tons in 1852-53 to **470,818 tons** in 1894-95. But to obtain a full conception of the Bengal salt trade it is necessary to add to the figure just mentioned the quantities of Indian salt imported coastwise and the small local production of Orissa and Behar. From the table given (*page 10*) of the coastwise transactions in salt it will be seen that the traffic has been on the whole steadily improving, although the total is still unimportant when compared with the foreign supply. The figures of the coastwise imports into Bengal were in 1889-90, 14,338 tons; in 1890-91, 23,043 tons; in 1891-92, 24,195 tons; in 1892-93, 23,707 tons; in 1893-94, 21,149 tons; and in 1894-95, **27,358 tons.** Statement No. I (*page 64*) shows the manufacture to have been 8,759 tons in 1894 and

Orissa Salt.

7,663 tons in 1895. This consists of the salt of Orissa and the salt from the saltpetre refineries of Behar. From 1892-93 Government took over the manufacture of salt on the Chilka lake, and not being in full operation in that year the out-put was but small (2,460 tons). It may be accepted that Orissa and Behar together durng the past five years have not contributed more than 8,000 tons to the Bengal supply. But it may be added that, while an expansion of the Orissa production may be looked for, that of Behar may be expected to decline. The statement (*page 8*) gives the returns of Orissa salt during the past five years.

SALT: CONSUMPTION.

24. ***BOMBAY.***—The area over which Bombay salt penetrates is greater than that of any other salt met with in India. The BARÁGARA salt permeates the whole of the northern tracts of the Presidency (including Kathiawar) as far south as Baroda. It extends into Rajputana, Central India and Malwa, contesting the markets of Pachbadra and Sambhar salt. It is even still more largely distributed into the Central Provinces and even to the North-West Provinces (as for example in Hathras, Fyzabad and Benares). About 31 per cent. of the production is normally consumed in the Bombay Presidency, 27 per cent. in the Central Provinces, 20 per cent. in the North-West Provinces and 21 per cent. in Rajputana and Central India.

BOMBAY: Baragara.

25. But the BOMBAY *SEA-SALT* has a far wider and more important area of distribution than the Barágara. It holds the whole country south of Baroda throughout the province and to the far south in the Nizám's Dominions and Mysore, with large quantities even conveyed to Travancore and Cochin. It penetrates the Madras Presidency as far as Bezwáda and is exported by coasting vessels to Calcutta. It is diffused through the Central Provinces and Berar, often side by side with Barágara salt, until it is met on the one hand by the small quantities of imported salt that find their way into the Central Provinces and Chutia Nagpur, and on the other by the Sambhar salt in the North-West Provinces.

Sea Salt.

About 36 per cent. of the sea-salt manufactured is consumed within the Presidency; 16 per cent. goes to the Central Provinces; 10 per cent. to the Nizam's Dominions; 20 per cent. to British Malabar; 7 per cent. to Cochin and Travancore; and about 8 per cent. to Calcutta.

26. It has been stated that "the success of Bombay sea-salt in competition with other salts in the markets outside the Presidency is due to the enterprise of the Bombay traders, and the skill of the manufacturers in producing salt to suit the markets which they supply. For instance, much attention has been paid to the production of light salt; and as it is sold at the works and duty levied by weight but retailed in the districts above the ghâts by measure, this gives the Bombay traders an advantage over those dealing in heavy salt. This is one of the principal reasons why Bombay salt is carried so far into the Madras Presidency in the face of the competition of the Madras Salt." (*Conf. with para. 29 below.*)

27. ***SIND.***—Practically all the salt manufactured is locally consumed. A small import in rock salt from the Panjab takes place, and possibly a certain quantity of earth salt is carried across the frontier from the neighbouring Native States that surround the Province.

SIND:

28. ***Traffic in the Salt of Bombay and Sind.***—Statement No. I (*page 64*) shows the production of last year to have been 419,417 tons, a figure that manifests a decrease on the previous year's production of 4·29 per cent., though on the average of the three previous years it represents an increase of 15·78 per cent. It may be useful to record here the production during the past five years, *viz.*, in 1891, 389,609 tons; in 1892, 330,741 tons; in 1893, 317,804 tons; in 1894, 438,229 tons; and in 1895, **419,417 tons**. The rail-borne returns (*pages 10-11*) of all forms of salt from Bombay (Port Town and Province) show the exports to have been **122,210 tons** from the province, and **15,077 tons** from the port town. Of the former amount the Central Provinces took 52,665 tons; the Nizam's Dominions 22,163 tons; the North-West Provinces 15,758 tons; Rajputana and Central India, 13,257 tons; Berar 14,560 tons and Mysore 2,395 tons. Of the latter the (port town) exports by rail went mainly to Mysore, with smaller quantities to Madras and the Bombay Presidency. The Sind exports by rail were purely nominal (111 tons), but Karachi exported last year 7,088, nearly the whole of which went to the province. The coastwise transactions will be seen from the table below (*page 10*) but it may be here remarked that Bombay furnishes fully three times as much as it imports. Further, its imports last year, *viz.*, 46,910 tons came from other ports in the Presidency to the port town of Bombay. Of the **165,080 tons** exported by all Indian Ports, Bombay town gave 157,778 tons. Of that amount Madras took 44,498 tons; Bengal 25,229 tons; Travancore 19,329 tons; Goa 10,871 tons and other ports in the Bombay Presidency 49,565. Practically it may be said that after leaving out of account the interchanges between Bombay port town with other ports within the Presidency, the coastwise exports in Indian salt are from Bombay port town to Madras, Bengal and Travancore. The consignments to Goa are more than compensated for by the rail-borne exports from Goa to the Maratha Country.

Traffic in Bombay and Sind Salts.

29. ***MADRAS.***—Excluding the two west coast districts (that consume imported salt) it may be said that the remaining districts of the Presidency are mainly supplied with locally manufactured SEA-SALT. The exports from the province are from Ganjam to Orissa and from Godávari and Kistna into the Nizám's Dominions. In fact a large amount of the salt used in Mysore and the Nizám's Diminions and even a considerable proportion of that taken by the Central Provinces is derived from the Madras factories. The exports by sea are chiefly to Calcutta and occasionally also to the Straits Settlements. The Calcutta traffic is said to be unpopular because of the necessity to send the salt in sealed bags. The imports are mainly from Bombay, the lighter salt of that province "notwithstanding its inferior quality" having ousted the Madras salt from Malabar, South Canara, Mysore and even Coimbatore and Salem.

MADRAS:

30. ***Traffic in the Salt of Madras.***—Statement No. 1 (*page 64*) shows the production of salt in this province to have been **266,222 tons** during the year under review. That production represents a decrease of 18·46 per cent. on the figure of 1894 and of 14·60 on the average for the past three years. From what has been stated, however, it will be understood fluctuations in the returns of evaporation salt cannot be regarded as prognostications of any decline in the trade. They may be due to bad manufacturing seasons or to large accumulated reserve stocks. This idea is fully borne out by the returns of production for the past five years, *viz.*, 355,712 tons in 1891; 338,287 tons in 1892; 269,138 tons in 1893; 326,501 tons in 1894; and 266,222 tons in 1895.

Traffic in

SALT: TRADE. The rail-borne trade of Madras Presidency shows an export of 7,138 tons, or nearly double the exports of the previous year (*see page 10*). Practically the whole of these exports went to the Nizám's Dominions and to Mysore. The port towns of Madras, however, exported by rail a very much larger quantity, namely, 87,578 tons, which was distributed all over the Presidency with small quantities consigned to the Nizám's Dominions and Mysore. The coastwise traffic has already been indicated under Bombay. It is chiefly the growing demand for the light salt of the Western Presidency. The exports were 4,578 tons—a figure that will be observed to be very nearly double that of the previous year (*page 10.*) The exports are largely to Calcutta.

IMPERIAL:

IV.—IMPERIAL TRAFFIC.

31. By way of concluding this review of the features of last year's Production and Consumption of Salt, it may be as well to furnish certain statistical information that is best exhibited for the provinces of India collectively.

Production. 32. ***PRODUCTION OF SALT IN INDIA.***—The following table may be given of the chief items of production, classified more or less on the plan of the foregoing remarks. The totals differ from those of Statement No. 1 (*page 64*) mainly through the exclusion from this analysis of the salt made in Aden and that in the Native States of Cutch and Kathiawar:—

	1891.	1892.	1893.	1894.	1895.
	Tons.	Tons.	Tons.	Tons.	Tons.
NORTHERN INDIA.					
Sambhar	79,134	42,716	70,992	277,974	196,727
Other Rajputana salts	23,905	21,818	11,821	61,377	51,997
Panjab and Kohat mines	103,909	91,944	97,091	96,837	96,471
Mandi, Sultanpur, Gwalior and the Saltpetre refineries	13,142	11,543	9,845	10,881	12,307
BOMBAY.					
Sea-salt and Barágara	378,899	319,570	308,613	430,059	408,553
SIND.	10,710	11,171	9,191	8,170	10,864
MADRAS.					
East coast sea-salt	355,712	338,287	269,138	326,501	266,222
BENGAL.					
Orissa sea-salt	329	2,460	565	7,709	6,532
BURMA.					
Sea coast salt and Brine wells	10,909	11,861	13,234	17,517	19,245
TOTAL	976,649	851,370	790,490	1,237,025	1,068,918

Private Enterprise. 33. ***GOVERNMENT AND PRIVATE ENTERPRISE.***—From the frequent mention that has already been made of the extent to which salt manufacture is passing into the condition of private enterprise, it will not be necessary to comment on the returns shown in the following table:—

Analysis of the Published Returns of Indian Marine Salt.

	1895.		1894.		1895.	1894.
	Manufactured by Government.	Manufactured otherwise than by Government.	Manufactured by Government.	Manufactured otherwise than by Government.	TOTAL.	TOTAL.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Madras	60,667	205,555	60,643	265,858	266,222	326,501
Bombay and Sind	111,376	308,040	108,045	330,184	419,417	438,229
Bengal	6,532	...	7,709	...	6,532	7,709
TOTAL	178,575	513,595	176,397	596,042	692,171	772,439

Roughly speaking, about three times as much marine salt is made by private enterprise (under the license system) as by Government. (*Conf. with paras. 10, 15, 25 and 29.*)

34. ***FOREIGN IMPORTS.***—In this connection and in continuation of the remarks, paragraph 8, it may be desirable to give here a brief statement of the traffic in Foreign Salt, imported into India during the past five official years:—

Foreign Imports.

Salt imported into all India from Foreign Countries.

	Tons.	Cost per 100 maunds.	Percentage increase or decrease in value on preceding year.
		R	
1890-91	395,243	71·2 to 81·2	—12·9
1891-92	373,953	57·5 to 69	—19·4
1892-93	360,042	58·5 to 65·1	— 8·1
1893-94	412,876	72·9 to 80·8	+37·2
1894-95	508,375	57·2 to 64·3	+ 6·5

In order to indicate the countries from which these foreign supplies were drawn, the following table may be given:—

Countries from which India imports Salt.

	1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
	Tons.	Tons.	Tons.	Tons.	Tons.
United Kingdom	273,008	222,260	241,061	268,715	314,753
Germany	60,540	103,403	47,391	47,811	82,156
Arabia	11,322	9,840	25,887	21,475	19,418
Aden	36,662	33,969	37,282	51,051	44,456
Other Countries	13,711	4,481	8,421	23,824	47,592
TOTAL IN TONS	395,243	373,953	360,042	412,876	508,375

35. ***IMPORTS IN RELATION TO CONSUMPTION.***—The relation of imported salt to local manufactures specially along the coast may be shown by the following table:—

Consumption in relation to Imports.

Consumption in Relation to Imports in 1894-95.

PROVINCE.	Total consumption (official year).	Quantity imported (official year).	Percentage of imported salt to total consumption in 1894-95.	Percentage of imported salt to total consumption in 1893-94.
	Tons.	Tons.		
Bengal	378,379	459,523	121·45	99·49
Madras	300,912	78	0·03	0·022
Bombay, including Sind	252,496	332	0·13	0·05
Northern India	284,678	...	...	...
Burma	33,456	48,442	144·79	87·84
TOTAL	1,249,921	508,375	40·67	33·54

It will thus be seen that last year the total imports corresponded to 40·67 per cent. of the consumption. But during the year under review the imports were greatly in excess of the actual necessities of the receiving provinces, so that large stocks are doubtless in hand, and next year may show a slight falling off in the imports unless freights are again abnormally low.

SALT: TRADE.

PROVINCIAL:

V.—INTERNAL OR PROVINCIAL TRADE IN SALT.

36. *COASTWISE TRANSACTIONS.*—By way of concluding this brief review of the Production and Consumption of Salt in the various provinces of India, it is only necessary now to show the shares in the traffic of distribution accomplished coastwise and by rail and river :—

Coastwise.

Imports and Exports of Indian Salt Coastwise.

		1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
		Tons.	Tons.	Tons.	Tons.	Tons.
Bengal	Imports into	23,043	24,195	23,707	21,149	27,358
	Exports from	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*
Bombay	Imports into	40,434	39,389	42,312	43,791	46,910
	Exports from	124,166	144,622	141,294	134,122	157,778
Sind	Imports into	208	223	205	205	281
	Exports from	223	227	208	211	286
Madras	Imports into	48,204	51,661	45,996	39,704	43,424
	Exports from	3,341	2,868	4,160	2,742	4,578
Burma	Imports into	1,502	1,833	1,702	1,626	2,626
	Exports from	2,159	1,106	2,143	1,813	2,438
TOTAL	Imports	113,391	117,301	113,922	106,475	120,599
	Exports	129,889	148,823	147,805	138,888	165,080

The interest in the coastwise trade in salt centres in the Bombay exports and in the extent to which these both by coast and rail are being distributed over India.

Rail-borne Traffic.

37. *RAIL-BORNE TRADE.*—The amount of salt carried on the railways and by boats and steamers on the rivers has been fully commented on in the Chapter on Areas of Consumption, but it may serve a useful purpose to give in this place an abstract of the returns during the past five years :—

Imports and Exports of Salt, carried by Rail and River, during 1890—95.

		1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
British Provinces. (*Exluding Chief Seaports*).		Tons.	Tons.	Tons.	Tons.	Tons.
Bengal	Imports into	273,234	280,553	289,480	276,716	296,507
	Exports from	3,963	5,072	4,276	3,600	3,136
Bombay	Imports into	855	828	827	854	1,110
	Exports from	106,521	115,429	111,900	131,643	122,210
Sind	Imports into	7,075	7,413	7,466	7,387	7,440
	Exports from	9	47	71	116	111
Madras	Imports into	75,785	78,197	83,566	86,785	85,188
	Exports from	4,011	5,136	5,792	4,241	7,138
N.-W. P. and Oudh	Imports into	140,537	145,397	164,621	150,594	142,557
	Exports from	2,598	2,741	2,903	2,643	2,481

Imports and Exports of Salt, carried by Rail and River, during 1890–95 —continued.

		1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
		Tons.	Tons.	Tons.	Tons.	Tons.
British Provinces—continued. (*Excluding Chief Seaports*)—continued.						
Panjab	Imports into	8,000	10,716	12,098	9,315	10,093
	Exports from	19,156	17,773	16,299	14,023	14,940
Central Provinces	Imports into	48,968	55,108	54,265	57,685	57,868
	Exports from	119	563	860	872	925
Berar	Imports into	15,191	14,816	14,640	15,612	14,809
	Exports from	13	41	2	20	6
Assam	Imports into	22,389	23,813	22,989	20,581	23,927
	Exports from	...	5	18	28	27
Total of Provinces	Imports	592,034	616,841	649,952	625,529	639,499
	Exports	136,390	146,807	142,121	157,186	150,974
Native States.						
Rajputana and Central India.	Imports into	13,361	14,110	14,340	17,406	15,964
	Exports from	111,597	123,037	143,956	117,723	117,068
Nizám's Dominions	Imports into	28,759	30,577	31,171	28,178	32,037
	Exports from	65	44	87	48	54
Mysore	Imports into	111,062	13,444	16,246	16,604	16,388
	Exports from	5	4	7	7	2
Total of Native States	Imports	53,182	58,131	61,757	62,188	64,389
	Exports	111,667	123,085	144,050	117,778	117,124
Chief Seaports.						
Calcutta	Imports into	60	22	125	85	61
	Exports from	301,151	307,335	318,531	301,773	326,455
Bombay	Imports into	9	69	22	23	29
	Exports from	7,407	8,007	12,196	15,373	15,077
Karachi	Imports into	12	2	1	5	13
	Exports from	6,687	7,084	7,092	7,079	7,088
Madras Ports	Imports into	241	4	18	2	295
	Exports from	82,236	82,751	187,885	88,643	87,578
Total of Seaports	Imports	322	97	166	115	408
	Exports	397,481	405,177	425,704	412,868	436,198
Grand Total	Imports	645,538	675,069	711,875	687,832	704,296
	Exports	645,538	675,069	711,875	687,832	704,296

II.—COAL (*Kóyelah, Hind.*).

VI.—PROSPERITY AND OUTTURN OF THE INDIAN COAL MINES.

COAL: PROSPERITY and OUTTURN.

38. Coal production in India continues to expand in a most significant manner. The output in 1894 came to 2,820,652 tons and showed thereby an increase on the production of 1893 of 10·10 per cent. The record of 1895 is not only the highest but it manifests the greatest expansion hitherto attained. The output will be seen, Statement No. 1 (*page 65*) to manifest for 1895 a production of 4,371,734 tons valued at ₹14,520,836. That is to say, an expansion of 54·99 per cent. on the returns of 1894 and of 65·59 per cent. on those of the average for the three previous years. And, if the year 1888-89 be left out of consideration, the commercial imports of foreign coal in 1895 (excluding coke, patent fuel and Government stores) were also the highest on record, *viz.*, 808,713 tons. When it is recollected that coal in India is entirely used up by the shipping, railways, and factories, and that there is practically no demand for domestic purposes, the full significance of these figures is obtained. They represent directly the magnitude of India's commercial dealings with the world, the improvement in the facilities of internal communication, and the advancement of her manufacturing enterprise.

Production.

Import Traffic.

39. To a certain extent the import traffic in coal is governed by the exigencies of the export trade in jute, tea, etc., and consequently by the freights ruling. If low, coal, salt, and other such commodities are doubtless brought to the country, practically as ballast, by the shipping concerned in the export trade. Surplus stocks may thus temporarily be abnormally increased without the improvement of imports representing immediate demands. But no such explanation can hold good in the case of local production. The output of the Indian mines, fifteen years ago (say the average of the years 1879, 1880 and 1881) was just under one million tons and India's total supply of coal was then approximately 1,500,000 tons. The amounts recorded above as the production and imports of 1895 show a total of 5,180,447 tons. Had coal, during the period of expansion indicated, begun to find its way into the domestic economy of the millions of population, that increase would have been of comparatively little moment. Indeed it may be added that, with the advance of civilization and the extension of European customs, the possibility of a vast demand for coal and coke to meet domestic necessities cannot be regarded as an improbable contingency.

As against the prosperity indicated by the increased demand for coal, it may be pointed out that the import traffic in the mineral has for some years past practically remained stationary, instead of expanding commensurately with the necessities for fuel. With the exception of the supply drawn by Bombay, the foreign coal traffic might be almost characterised as an adjustment of imports on exports rather than the supply of a commodity for which there is a steady demand. Indeed it might be affirmed that the extinction of the trade is but a matter of time. There is nothing to show that a production of 4,371,734 tons is phenomenal, though so sudden an expansion as took place last year may have temporarily glutted the markets. Everything in fact points to a prosperity for the coal-mining industry that will eclipse even the achievements of the past few years. Mr. James Grundy (*Report on the Inspection of Mines in India, 1895*), however, says that "the greatly increased production has not lowered the prices, nor flooded the market with coal; on the other hand, I believe that in 1894, and the beginning of 1895, the ruling prices for coal of fair quality were good, as compared with working costs they might I think, be described as high; and even poor coals could be sold at a fair price. I believe the output was barely equal to the demand." It is not known how far the declared value at the pits of the coal produced in India can be trusted, but from the figures supplied to this office it would appear that the coal from the Burdwan mines is on the average 46 per cent. dearer than that from Manbhum. A discussion of the price of coal has, therefore, been purposely omitted from this review. (*Conf. with p. 22.*)

Extinction of Imports.

Sudden expansion in production.

Price.

PRODUCTION.

VII.—REGIONS OF PRODUCTION AND SUPPLY.

CHARACTER OF INDIAN COAL:

40. With the exception of Bombay and Sind, of the North-West Provinces and Oudh, of Rajputana and Mysore, practically all the other Provinces and Native States contain coal. India in fact possesses an inexhaustible store of the mineral. But none of it belongs to the so-called carboniferous period of geologists. Indeed the Indian coal-measure rocks are not all of one formation. The coal of Peninsular India occurs in the Gondwana system, the fossil flora of which has mesozoic facies. The coal of extra-Peninsular India occurs in rock of cretaceous or tertiary age. The Gondwana beds are found in the Central and North-Eastern Provinces (*e.g.* Western Bengal, the Central Provinces and the Nizám's Dominions) with scattered patches in the extreme north-east of the Madras Presidency. The tertiary coal may be traced along the outer margin of the Indo-Gangetic plains from Sind to Pegu, but it is only in Assam and Upper Burma that valuable cretaceous coal is met with. Some of the Indian deposits have only very recently been tapped and large areas rich in the mineral remain untouched, so that even the very encouraging results of last year's operations may be said to give but a foretaste of future possibilities.

Number of Collieries.

41. During the year under review there were 233 collieries at work, distributed as follows: 218 in Bengal; one in Madras; two in the Panjab; two in the Central Provinces; five in Assam; one in Burma; one in Central India; one in the Nizám's Dominions; and two in Baluchistan. In 1894 there were 123 collieries; in 1893, 96 collieries; and in 1892 only 88 collieries. There has thus been an increase of 110 collieries during the past year and of 137 during the past three years. The labour force in 1895 has been returned at 57,301; in 1894 it was given as 43,197; in 1893 as 37,679; and in 1892 as 38,645. It seems probable, however, that the figures of labour are not very complete. The Census of 1891 gives the coal miners for that year at 35,512, whereas in the annual returns of the mines it stood at 34,827.

Producing Collieries.

The following statement may be given as the production since 1878, the qualification being offered that the returns of the earlier periods there shown, are believed not to have been so accurate as those of recent

years. The table as it stands, however, is instructive since it exhibits the relative dates of starting and the comparative production values of the great coal-bearing localities of India :— COAL: PRODUCTION.

Quantity, in Tons, of Coal Produced in the Provinces of India.

Years.	Madras.	Bengal.	Panjab.	Central Provinces.	Assam.	Burma.	Central India.	Nizám's Dominions.	Baluchistan.	Total.
1878 .	...	957,243	...	57,967	...	...	...	...	...	1,015,210
1879 .	...	891,047	...	33,515	...	...	...	...	...	924,562
1880 .	...	988,565	...	31,228	...	...	...	...	...	1,019,793
1881 .	...	930,203	...	67,527	...	...	...	...	..	997,730
1882 .	...	1,038,872	...	91,370	...	...	...	...	...	1,130,242
1883 .	...	1,200,957	...	115,019	...	...	...	...	...	1,315,976
1884 .	...	1,257,392	...	121,833	16,493	...	2,100	...	...	1,397,818
1885 .	...	1,123,700	...	119,116	43,707	...	7,698	...	...	1,294,221
1886 .	...	1,186,802	...	117,287	70,859	...	13,539	...	...	1,388,487
1887 .	...	1,319,090	7,523	128,981	89,302	...	15,497	3,259	411	1,564,063
1888 .	...	1,380,594	11,249	157,768	101,528	...	41,580	13,382	2,802	1,708,903
1889 .	...	1,541,356	22,835	144,465	116,676	...	52,956	59,646	8,238	1,946,172
1890 .	...	1,626,245	40,677	137,022	145,708	...	77,842	125,486	15,541	2,168,521
1891 .	20	1,747,122	60,714	141,736	154,208	...	69,741	144,668	10,368	2,328,577
1892 .	61	1,920,050	66,352	132,005	164,050	3,670	88,623	149,601	13,284	2,537,696
1893 .	502	1,902,866	77,294	135,118	164,420	9,938	94,348	157,421	20,094	2,562,001
1894 .	1,337	2,035,934	66,467	140,495	169,448	12,111	132,837	240,525	21,498	2,820,652
1895 .	1,737	3,550,069	72,493	122,776	172,717	17,289	118,479	292,915	23,259	4,371,734

Indian Mines.

VIII.—PRESENT POSITION AND FUTURE PROSPECTS.

POSITION and PROSPECTS.

42. ***FOREIGN COAL.***—It may now be desirable to exhibit some of the leading characteristics of the areas of supply, somewhat after the manner attempted above with salt, *viz.*, to denote the markets met by the various coal-producing centres. Imported foreign coal, as in the case with imported salt, will accordingly be treated as a centre of supply, and it will perhaps elucidate matters if the imports be disposed of in the first instance. The following table may be given of the total imports for the past fifteen years :— FOREIGN SUPPLY:

Analysis of Imports of Foreign Coal into India during the past fifteen years.

(Coke and Patent Fuel, as also Government Stores have been excluded from columns 1 to 6 but included in the Grand Totals, column 7.)

Years.	1 Into Bombay.	2 Into Sind.	3 Into Madras.	4 Into Burma.	5 Into Bengal.	6 Total.	7 Grand Total, including Coke, Patent Fuel and Government Stores.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1880-81 . .	482,406	25,705	10,629	86,562	64,998	670,300	729,058
1881-82 . .	404,243	13,376	37,714	77,523	85,044	617,900	648,201
1882-83 . .	420,055	10,857	24,460	95,305	74,610	625,287	652,347
1883-84 . .	491,776	17,593	28,294	78,312	62,534	678,509	712,900
1884-85 . .	504,875	18,161	28,826	84,779	62,536	699,177	757,673
1885-86 . .	528,499	35,769	34,662	63,091	97,047	759,068	805,700
1886-87 . .	521,455	40,282	38,232	81,224	46,923	728,116	780,959
1887-88 . .	572,358	38,803	28,204	111,589	49,206	800,160	886,680
1888-89 . .	638,159	41,515	35,874	77,741	17,176	810,465	877,843
1889-90 . .	431,200	31,596	41,662	47,036	21,297	572,791	656,867
1890-91 . .	628,678	48,992	46,392	35,999	7,571	767,632	817,004
1891-92 . .	561,651	53,053	41,528	47,843	20,120	721,195	773,624
1892-93 . .	498,652	34,475	63,929	26,966	10,727	634,749	703,341
1893-94 . .	423,094	32,677	63,206	19,230	5,799	544,006	591,007
1894-95 . .	647,917	40,469	79,378	34,405	6,544	808,713	848,367

COAL: POSITION and PROSPECTS.

43. Column 1 shows the transactions with Bombay, and it will be at once perceived that the supply drawn from foreign countries has in no way expanded concomitantly with the expansion of the manufacturing industries of the Western Presidency. This will be exemplified by the following facts:—

FOREIGN CONTRIBUTION:

Analytical Statement of the Cotton Mills of India.

Cotton Mills and their Coal supply.

YEARS.	Number of Mills.	Number of Looms.	Number of Spindles.	Number of persons employed.
1880-81 . .	58	13,283	1,471,730	47,955
1881-82 . .	62	14,386	1,550,944	52,231
1882-83 . .	62	15,116	1,654,108	53,624
1883-84 . .	74	16,251	1,895,284	61,836
1884-85 . .	81	16,455	2,037,055	61,596
1885-86 . .	89	16,548	2,198,545	71,577
1886-87 . .	90	16,926	2,202,602	72,590
1887-88 . .	97	18,840	2,375,739	80,515
1888-89 . .	108	22,156	2,670,022	92,126
1889-90 . .	114	22,078	2,934,637	99,224
1890-91 . .	125	23,845	3,197,740	111,998
1891-92 . .	127	24,670	3,268,524	117,922
1892-93 . .	130	26,317	3,378,303	120,898
1893-94 . .	137	29,392	3,539,681	130,570
1894-95 . .	144	34,161	3,711,669	139,578

Bombay.

44. To bring out the full bearing of the figures displayed in the above table, on the question of the coal supply of Western India, it is only necessary to add that the cotton spinning and weaving industry of India centres mainly in the Bombay Presidency—one might almost say in the town and neighbourhood of Bombay itself. In 1892-93, out of the total of 127 mills 88; in 1893-94, out of the total of 137 mills 95 and in 1894-95, out of the total of 144 mills 100 were in Bombay. It will thus be observed that the returns of the imports of foreign coal into Bombay give no indications of having responded to the uniform and steady expansion of this great and important industry. And to the above table might have been added the figures to show the remarkable increase that has taken place throughout Western India in factories for ginning, cleaning, and pressing cotton. In 1894-95 these were returned as 176 in number, the total for all India having been 453. On the other hand, the trade revealed by columns 2 and 3 (table, page 13, *vis.*, the imports into Sind and the imports into Madras) may be said to have manifested a slow though steadily increasing demand for foreign coal. The rail and river-borne traffic from the Nizám's Dominions into Madras shows, however, an even more remarkable increase in the supplies drawn from the Singareni and Madras mines. Thus in 1890-91, the Madras imports of Indian coal were 31,408 tons, and in 1894-95 they came to 157,998. During the same periods the Madras seaports took of Indian coal 1,076 tons, 1890-91, and 3,726 tons in 1894-95. A further examination of the rail-borne traffic demonstrates the major portion of these quantities to have been derived from the Nizám's Dominions.

Burma.

45. The somewhat sudden decline in the consumption by Burma of foreign coal, shown in column 4, (*Table on page 13*), is doubtless due to some extent to the majority of the 64 rice mills of that province having almost simultaneously adopted the system of using up the rice husk as the fuel to drive their machinery. But in this connection it must be pointed out that Bengal coal has within the past few years entered into

Bengal.

direct competition with the foreign supply obtained by Burma. On page 17 the coastwise traffic will be seen to have expanded from 64,744 tons in 1890-91 to 72,049 tons in 1894-95. The imports into Bengal (column 5) show so uniformly and constantly a shrinkage of the supply of foreign coal that it is impossible to avoid the belief that this is but the reflex action of the expansion of the Bengal local production.

INDIAN PRODUCTION:

INDIAN COAL.—The areas at present open to foreign coal are therefore Bombay and Sind, Madras, and to a certain extent Burma. In another paragraph will be more fully displayed the strong competition that already exists for these markets, through local production. And it may be affirmed that the future will see a rapidly augmented competition on the part of the Indian mines.

Bengal.

46. *BENGAL.*—During the year under review the mines of this province turned out **3,550,069 tons.** The value of that amount has been returned as **₹10,242,689.** This Bengal production thus represents **81·2 per cent.** of the total for all India. It is also an expansion that amounts to **32·2 per cent.** on the provincial average production for the years 1892—94. During the year there were 218 collieries at work in Bengal, as compared with 109 in 1894, 82 in 1893, and 76 in 1892. These collieries may be grouped

according to the districts in which they occur, and their present comparative values indicated by the figures of last year's outturn:—

Burdwan	Collieries	1,600,137 tons.
Bankura	,,	9,502 ,,
Hazaribagh	,,	637,661 ,,
Manbhum	,,	1,270,597 ,,
Sonthal Parganas	,,	32,172 ,,
Total Production of Bengal Collieries		**3,550,069 tons.**

In the Burdwan district occur the following groups of mines:—the Raniganj, Kali-pahari, Assansol, Sitarampur, and Barakar—93 mines in all. In Hazaribagh the Giridih series, 7 mines. In Manbhum 130 mines, in the Santhal Parganas 4 mines, and in Bankura 4 mines. It would perhaps be beyond the scope of a review of the year's production to go into much details regarding these Bengal mines, but a few statements regarding some of the chief fields may be here given in order to show the estimated available supply and consequently future prospects.

Of the *KARHARBARI* mines (Giridih)—200 miles from Calcutta—it has been stated that the field covers 8 square miles. The coal occurs in three principal seams. The estimated amount of coal has been put at 136,000,000 tons. The first mine opened in this field was the Kuldiha (1869), the Karharbari following in 1871. The Jubilee pit is 650 feet deep and is supposed to be the deepest coal shaft in India.

The *RANIGANJ-BARAKAR* coal field is about 120 miles from Calcutta. It covers 500 square miles with perhaps double that area dipping below the alluvial beds to the east. The available coal from these fields has been put at 14,000,000,000 tons. The first mine opened was the Raniganj in 1820.

JHERIA, in the valley of the Damuda and 16 miles west of Raniganj (District of Manbhum), has a field of 200 square miles calculated to contain 465 million tons.

BOKARO, two miles west of the Jeriah field, covers 220 square miles, some of the seams of coal area 83 feet in thickness. The coal stored up in this bed has been computed at 1,500 million tons.

RAMGARH lies south of Bokaro. It is comparatively a small field, about 40 square miles, and is estimated to contain 5 million tons of available fuel.

NORTH KARANPURA is situated at the head of the Damuda valley. It has an area of 472 square miles and is said to contain 8,750 million tons of coal.

SOUTH KARANPURA situated to the south-east of the Northern field and is supposed to have 75 million tons of coal.

DALTONGANJ in the valley of the Koel in Lohardaga district covers an area of 200 square miles and is estimated to contain 11,600,000 tons of excellent fuel.

TALCHIR in Orissa, a coal field of some 700 square miles in extent, is situate in the valley of the Brahmini. The coal is believed to be of inferior quality, but the field has not as yet been fully surveyed.

RAJMAHAL on the western margin of the hills of that district, is a coal field 70 square miles in extent.

DARJEELING coal field is not very important. It occupies a narrow zone which stretches along the foot of the Himalaya from Pankabari to Dalingkote. The coal is of Gondwana age, but much crushed assuming the character of graphite.

47. ***CENTRAL PROVINCES.***—The mines of these provinces are located in the following districts, and yielded last year the amounts shown:— **Central Provinces.**

Narsinghpur (*MOHPANI* Mines)	21,393 tons.
Chanda (*WARORA* Mines)	101,383 ,,
Total Production of Central Provinces Collieries	**122,776 tons.**

These returns show a decrease on the production of 1894 of 12·61, and on the average of the three previous years a decrease of 9·64 per cent. The decrease indicated has been entirely in the Government mines of Warora.

The *MOHPANI* field has its importance through its position with reference to the Great Indian Peninsula Railway. It is 95 miles by rail, west-south-west of Jabalpur. *WARORA* (including the Ghugus, Wun, Papur, Sasti, Paoni fields) has been estimated to contain 1,714 million tons, but of this wide area only Warora is being worked. Besides the fields actually worked there are others worthy of mention, such as the *SHAHPUR* and *PENCH*. The former occurs on the south of the Tawa valley, It contains seams of irregular thickness and inferior quality. The latter contains many seams of fair quality. *KORBA*, *MAND*, *RAIGARH-HINGIR* fields, in the Mahanadi valley, cover an area of 1,000 square miles, and some of the seams of coal are very thick, two having been ascertained to be 90 and 168 feet respectively. The Korba area has so far proved the most worthy of consideration as the coal is of good quality.

48. ***CENTRAL INDIA.***—The only coal field of this area at present being worked is that of *UMARIA* in Rewah. The output last year came to 118,479 tons, valued at ₹4,06,697. Its great value lies in its position, 34 miles from Katni station on the East Indian Railway, and tapped by the Katni-Bilaspur branch. It is consequently the nearest source of supply for the North-West Provinces and the Panjab. This fact may be fully exemplified by an examination of the rail-borne returns. The exports of coal from Central India were returned in 1890-91 as 62,930 tons; in 1894-95 they stood at 98,219 tons, and of the last-mentioned quantity the North-West Provinces and Oudh took 45,692 tons, the Panjab 34,600 **Central India.**

COAL: POSITION and PROSPECTS. INDIAN SUPPLY:

tons, and Bombay 17,092 tons. The Umaria field has an area of 3 square miles and has been estimated to contain 28 million tons of coal. But besides Umaria there are other coal fields in Central India of which the following may be mentioned:—*SOHAGPUR* an excellent coal field of 1,600 square miles extent and only a short distance from Umaria. The Katni-Bilaspur Railway passes along its western margin. *KORAR*, three miles north of Umaria, is a field of good coal of 9 square miles in extent and *BISRAMPUR*—a coal field in the central basin of Sarguja covers an area of 400 square miles of good coal suitable for locomotive purposes.

Nizam's Dominions.

49. *NIZAM'S DOMINIONS AND MADRAS.*—The lower Godavari coal fields.

The most important mine in Southern India is the *SINGARENI* in the Nizám's Dominions. The output from that mine was last year **292,915 tons**, being an expansion on the returns of the previous year of **21·78 per cent.** and on the average of the three previous years of 60·49 per cent. The immediate result of this expansion of production has been the steady growth of a by no means inconsiderable export to Madras and Bombay. In 1890-91 this stood at 64,664 tons and in 1894-95 at 201,076 tons. The respective shares taken by Madras and by Bombay of these rail-borne exports were: Madras 133,271 tons and Bombay 66,073 tons. The increasing importance of the Singareni mine is in fact one of the most significant features of the present Indian trade in coal. And with the completion of the East Coast Railway it will doubtless become even still more important.

KAMARUM, CHERLA, CHINNUR, MADAVARAM, and *BEDDADANOL* are coal fields that may be described as unexplored. Beddadanol is the most southern manifestation of coal in India. It covers an area of 5½ square miles, but contains worthless coal. *KAMARUM* is a field of good coal estimated equal to 1,132,560 tons. Its position in relation to present trade routes is somewhat unfavourable.

Madras

The Madras mines of this area are the *RAJAHZOMPALLI*. These mines can hardly, however, be regarded as fully established, and it may be thought that a comparison of last year's returns with those of the previous year, or even of the average of the three previous years, would not be very instructive; the output expanded for the two periods named by **29·92 per cent.** on the former and **174·41 per cent.** on the latter. Recent discoveries would, however, seem to support the inference that most of the Godavari mines have a future of much promise especially in relation to the East Coast Railway, to a possible future iron smelting industry, and to the port of Vizagapatam.

Panjab.

50. *PANJAB.*—Passing from the south to almost the extreme north-north-west of India another group of coal deposits is met with in the Panjab. On the Salt Range nummulitic coal occurs at several localities, such as Amb, Sunglewar, Chamil, Kutta Karuli, etc., but only in small quantities. The *DANDOT* colliery in the Jhelam district possesses a more promising supply than of the other localities just mentioned. The coal occurs at three places, but at its thickest is only about 2 feet 6 inches. The output from this mine has, notwithstanding the friable and pyritous condition of the coal, expanded considerably. The production of 1895 came to **72,493 tons**, or an expansion of **9·07 per cent.** on the return of 1894 and of 3·51 per cent. on the average of the three previous years. The coal is consumed (as also that of the Baluchistan mines) by the North-Western Railway. At *PIND* there is a seam three feet in thickness and at the *BHAGANWALLA* colliery a seam even thicker than that at Pind. At *CHITA PAHAR, HAZARA* and *BANNU* there are other coal fields as yet not fully explored. It may be doubted, however, whether the future will witness any material expansion of the Panjab mines.

Baluchistan.

51. *BALUCHISTAN.*—The coal mines of this province are those at *KHOST, QUETTA* and *MACH*, the last mentioned being prospective; it occurs in the Bolan pass. The production from the mines of the province came last year to **23,259 tons**, being an expansion on the previous year of **8·19 per cent.** and on the average of the three previous years of 27·15 per cent. At Khost new dips have been opened to take the place of the older workings. The coal of these mines meets the demands of Sind-Peshin Railway. The Quetta supply is not very satisfactory. The coal from the Sharigh colliery is very friable and has to be made into briquettes before it can be used.

Assam.

52. *ASSAM.*—Cretaceous and nummulitic coal occurs at many isolated places throughout this province as, for example, in the Dufla Hills, (a seam, by the by, of Gondwana coal); in the Khasi and Jaintia Hills, (Cherrapunji); in the Garo Hills (Darangiri); in the Lakhimpur district (Makum mines) and in the Naga Hills of Sibsagar. With the opening up of railway communication it seems highly probable that several of the areas of supply will be very greatly developed.

The *MAKUM* mines are those alone that are being systematically worked at present. The field contains several seams, one of which is over 100 feet thick, 75 feet of which is good coal. The output last year came to **172,717 tons**, being an expansion of **1·93 per cent.** on the production of the previous year and of 4·06 per cent. on the average of the three previous years. It has been estimated that there may be 18,000,000 tons of coal. The trans-Dekho Naga mines are worked by the Assam Tea Company, the output of which last year came to **92 tons**. The Nazira and Jaipur Naga Hills supply has been calculated to come to 20,000,000 tons.

Burma.

53. *BURMA.*—This province may be said to continue to give promise of being an important centre in coal supply. The output came last year (1895) to **17,289 tons**, being an expansion on the production of 1894, of **42·75 per cent.** and on the average of the three previous years of **101·67 per cent.** The chief fields are the *THINGADAW* coal fields (Letkakpines mines, Shwebo district) on the west bank of the Irrawadi; there are three localities with seams of about four to five feet in thickness, consisting for the most part of good, hard, compact coal which often contains imbedded lumps of amber-like resin. On the *CHINDWIN* river

near Kalewa, a 10-foot seam of good cretaceous coal occurs. In Arakan, Pegu (Thayetmyo mines) and in Tenasserim (Margui) coal is met with and to a small extent has been worked.

IX.—INTERNAL TRADE IN COAL.

54. This section will deal with the distribution of the supplies mentioned in the foregoing remarks. The table given at page 13 shows the total imports of foreign coal to have been last year **808,713 tons**; of that amount Bombay took **647,917 tons**, Sind 40,469 tons, Madras 79,378 tons, Burma 34,405 tons, and Bengal 6,544 tons. These quantities were of course received by the port towns, and either used up there or portions distributed by rail and river or re-exported coastwise. Since the returns of the internal trade make no distinction as to whether the coal referred to is foreign or Indian, it is impossible to exhibit the ultimate distribution of the foreign supply further than has been given. The remarks that follow must, therefore, be understood as referring to both foreign and Indian collectively. Of course it is practically in the case of Bombay only that any ambiguity exists.

The following statement of the Imports and Exports, coastwise, of Indian coal may be given for the past five years :—

Imports and Exports of Indian Coal Coastwise.

		1890-91. Tons.	1891-92. Tons.	1892-93. Tons.	1893-94. Tons.	1894-95. Tons.
Bengal	Imports into	1,633	940	492	3,044	5,951
	Exports from	105,721	123,087	195,760	246,456	189,619
Bombay	Imports into	3,606	206	50,330	73,015	58,421
	Exports from	...	...	11	...	173
Sind	Imports into	...	...	...	3,700	...
	Exports from	...	...	...	...	...
Madras	Imports into	20,410	40,514	48,479	37,496	44,788
	Exports from	158	76	519	68	120
Burma	Imports into	64,744	78,448	92,807	94,501	72,049
	Exports from	595	213	5	10	116
TOTAL	Imports	90,393	120,108	192,108	211,756	181,209
	Exports	106,474	123,376	196,295	246,534	190,028

The facts of most interest brought out by these tables will be seen at a glance. Bengal is the exporting province and the statistics of the past five years show a rapidly increasing demand. Burma imports fully a third of these Bengal coastwise exports, and the supplies drawn by Bombay and Madras as well as those secured by Burma have manifested a steady progression.

55. ***Rail and River Traffic.***—The amounts of coal carried by the railways during 1894-95 will be found in the Appendix (*pages 74-77*), but it may serve a useful purpose to give an abstract of the imports and exports from the chief centres during the five years 1890—95. The returns so tabulated may then be compared with the coastwise trade above and with the foreign imports (*page 13*), in order that the total imports or the total exports may be discovered, for each centre, during any one of the years in question. It may be here explained that the chief port towns (Calcutta, Bombay, Karachi and the Madras ports) are treated as if they were provinces, so that the trade of these large towns can be discovered apart from that of the provinces in which they are placed.

Imports and Exports of Coal, carried by Rail and River, during 1890—95.

		1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
British Provinces. (*Excluding Seaports.*)		Tons.	Tons.	Tons.	Tons.	Tons.
Bengal	Imports into	45,565	52,718	66,500	78,806	97,205
	Exports from	1,041,012	1,125,715	1,317,584	1,202,486	1,416,944
Bombay	Imports into	222,884	236,869	199,118	181,878	221,557
	Exports from	24,679	31,784	42,652	21,949	41,928

COAL: TRADE.

PROVINCIAL: Rail and River Traffic.

***Imports and Exports of Coal, carried by Rail and River, during 1890–95*—contd.**

		1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
		Tons.	Tons.	Tons.	Tons.	Tons.
British Provinces—contd. (*Excluding Seaports*)—contd.						
Sind	Imports into	11,861	14,708	6,357	4,769	7,075
	Exports from	93	3,117	792	40	15
Madras	Imports into	31,408	53,918	58,220	73,072	157,998
	Exports from	1,088	1,267	1,902	4,247	5,413
N.-W. P. and Oudh	Imports into	240,585	334,298	327,700	348,662	391,161
	Exports from	72,106	110,092	83,439	64,741	107,289
Panjab	Imports into	45,853	66,032	53,617	56,323	100,444
	Exports from	43	363	126	42	358
Central Provinces	Imports into	49,614	76,384	85,972	88,656	73,300
	Exports from	78,308	71,843	64,894	82,662	67,408
Berar	Imports into	31,407	33,567	27,529	37,184	31,454
	Exports from	163	491	627	1,841	571
Assam	Imports into	7,148	7,803	8,428	8,485	3,561
	Exports from	68,809	97,478	75,277	64,721	69,333
Total of Provinces	Imports	686,325	876,297	833,441	877,835	1,083,755
	Exports	1,286,301	1,442,150	1,587,293	1,442,729	1,709,259
Native States.						
Rajputana and Central India.	Imports into	59,221	83,463	81,230	39,848	73,707
	Exports from	63,030	81,869	75,363	97,544	98,219
Nizám's Dominions	Imports into	312	226	67	289	88
	Exports from	64,664	82,232	77,967	100,455	201,076
Mysore	Imports into	17,748	33,298	56,935	68,245	81,621
	Exports from	3	43	2	13	817
Total of States	Imports	77,281	116,987	138,232	108,382	155,416
	Exports	127,697	164,144	153,332	198,012	300,112
Chief Seaports.						
Calcutta	Imports into	863,234	871,656	998,883	854,709	1,013,084
	Exports from	43,379	39,548	35,378	41,918	43,034
Bombay	Imports into	5,134	6,075	8,096	12,677	10,761
	Exports from	124,438	159,516	120,781	84,411	103,603
Karachi	Imports into	103	180	791	12	.....
	Exports from	11,998	15,194	6,967	5,403	7,425
Madras Ports	Imports into	1,076	983	980	1,367	3,726
	Exports from	39,339	51,626	76,672	82,509	103,309
Total of Seaports	Imports	869,547	878,894	1,008,750	868,765	1,027,571
	Exports	219,154	265,884	239,798	214,241	257,371
Grand Total	Imports	1,633,153	1,872,178	1,980,423	1,854,982	2,266,742
	Exports	1,633,153	1,872,178	1,980,423	1,854,982	2,266,742

56. A glance at the figures given in the table above, of the rail and river-borne IMPORTS OF COAL during past five years, will suffice to convey the impression that there are three very important directions in this trade. These are *in order of magnitude* the imports of Calcutta; the imports of the North-West Provinces and Oudh; and the imports of the Presidency of Bombay. But it will also be readily perceived that there are two features of the import traffic that owe their interest to their *comparative insignificance, viz.*, the rail-borne imports of the town of Bombay and of the sea-ports of Madras. Lastly there are six items that are distinctly of value because of their each indicating a steadily *expanding demand* for coal, *viz.*, the imports of the Province of Bengal; the imports of the Presidency of Madras; the imports of the Panjab; the imports of the Central Provinces; the imports of Rajputana; and the imports of Mysore.

It will be instructive to analyse very briefly these specially interesting aspects of the rail-borne coal imports.

57. (*a*) Calcutta received by rail 863,234 tons of coal in 1890-91 and 1,013,084 tons in 1894-95. This is an expansion of 17·36 per cent. during the years named. Her rail-borne exports have averaged, say, 40,000 tons mainly to Eastern Bengal and Assam. It may be useful to give here a balance sheet of the Calcutta coal trade for the past five years showing the net supply to the city and its immediate neighbourhood.

Analysis of the Coal, Coke and Patent Fuel Trade of Calcutta.

	IMPORTS.				EXPORTS.				NET SUPPLY.
	1 Page 13.	2 Page 17.	3 Page 18.	4	5	6	7	8	9
	Foreign.	Coast-wise.	Rail.	Total Imports.	Foreign.	Coastwise.	Rail.	Total Exports.	Deduct total Exports (column 8) from total Imports (column 4).
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1890-91 . .	10,047	1,633	863,234	874,914	26,240	105,721	43,379	175,340	699,574
1891-92 . .	22,812	940	871,656	895,408	4,509	123,087	39,548	167,144	728,264
1892-93 . .	12,831	492	998,883	1,012,206	15,725	195,760	35,378	246,863	765,343
1893-94 . .	8,113	3,044	854,709	865,866	51,225	246,456	41,918	339,599	526,267
1894-95 . .	9,138	5,951	1,013,084	1,028,173	53,665	186,619	43,034	286,318	741,855

Coal Supply of Calcutta.

The figures shown in column nine may be regarded as representing the annual consumption since the surplus stock may be assumed to be on the whole a constant quantity.

N.-W. P. Increasing consumption.

58. (*b*) The North-West Provinces and Oudh received 240,585 tons of coal by rail during 1890-91 and 391,161 tons in 1894-95, or an expansion that comes to 62·59 per cent. By consulting the details of that traffic it is discovered that in 1890-91 Bengal province furnished 215,795 tons or 89·70 per cent. of the total and in 1894-95, 345,111 tons or 88·23 per cent. of the supply to these provinces. Then again we learn still further that the North-West Provinces derived their next largest contribution from Central India, doubtless from the Umaria coal mine chiefly. In 1890-91 they imported from Central India 24,768 tons or 210·9 per cent. of the total imports, and in 1894-95, 45,692 tons, being 11·68 per cent. on the supply of that year. But turning attention for the moment to the exports of coal by rail from these provinces, we learn that these were 72,106 tons in 1890-91 and had increased to 107,289 tons in 1894-95, or an expansion of 48·79 per cent. These exports have accordingly to be deducted from the returns shown in the table of imports in order to arrive at the net supply, what, by ignoring a constant surplus stock of slightly variable quantity, may be called the annual consumption. During the years in question the net supply was 168,479 tons in 1890-91; 224,206 tons in 1891-92; 244,261 tons in 1892-93; 283,921 tons in 1893-94; and 283,872 tons in 1894-95. Thus the consumption of these provinces has manifested a steady and substantial increase during the past five years. The exports go mainly to the Panjab ($\frac{3}{4}$th of the total), the balance to Rajputana, the Central Provinces and Bombay.

Bombay Presidency.

59. (*c*) Bombay Presidency rail-borne imports of coal are very significant. While showing occasional fluctuations they have practically remained stationary during the past five years. They were, as will be seen from the table (*page 17*), 222,884 tons in 1890-91 and 221,557 tons in 1894-95. At the same time the exports have similarly fluctuated but made no material change. The average for the past five years comes to 33,000 tons and last year's actual exports stood at 41,928 tons. The provincial average net imports by rail have been 180,000 tons during each of the past five years. But it may be interesting to examine with more detail these imports especially with relation to the sources of supply. During the year 1890-91, 118,379 tons were drawn from the port town (presumably foreign coal), 54,988 tons derived from the Nizám's Dominions (Singareni coal), and 49,254 tons derived from the Central Provinces (Warora and probably also Mohpani coal). Last year the corresponding figures were: foreign coal 93,556 tons (20·97 per cent. decrease); Singareni 66,073 tons (20·16 per cent. increase), and 37,419 tons Warora and Mohpani (24·03 per cent. decrease).

COAL: TRADE.

It will thus be seen that the character of the Bombay Presidency supply has been considerably changed within recent years. The production at the Indian mines is distinctly checking the trade in imported coal, thereby releasing larger quantities of that coal to meet the growing demands of the town of Bombay itself.

PROVINCIAL:

60. (*d*) But turning now to the Bombay port town rail-borne transactions, the total imports in 1890-91 were 5,134 tons, and of that amount 5,113 tons were drawn from the Presidency, 37 tons from the Nizám's Dominions; and none from Berar. The corresponding figures for 1894-95 were total rail imports by port town of Bombay 10,761 tons, of which 10,421 tons were derived from the Presidency, 215 tons from Nizám's Dominions and 125 tons from Berar.

By way of concluding this statement of the Bombay traffic in coal it may be desirable to show the net supply of the town of Bombay, by way of comparison with that given above for Calcutta. This will be derived by deducting the total of all exports (by sea and by rail) from the total of all imports consigned to the town of Bombay.

Analysis of the Coal, Coke and Patent Fuel Trade of the Town of Bombay.

Coal Supply of Bombay.

	Imports.				Exports.				Net Supply.
	1 Page 13.	2 Page 17.	3 Page 18.	4	5	6	7	8	9
	Foreign. Tons.	Coastwise. Tons.	Rail. Tons.	Total Imports. Tons.	Foreign. Tons.	Coastwise. Tons.	Rail. Tons.	Total Exports. Tons.	Deduct total Exports (column 8) from total Imports (column 4). Tons.
1890-91 . .	632,926	3,606	5,134	641,666	*Nil*	*Nil*	124,438	124,438	517,228
1891-92 . .	566,231	206	6,075	572,512	5	*Nil*	159,516	159,521	412,991
1892-93 . .	504,083	50,330	8,096	562,509	*Nil*	11	120,781	120,792	441,717
1893-94 . .	427,805	73,015	12,677	513,497	2	*Nil*	84,411	84,413	429,084
1894-95 . .	653,729	58,421	10,761	722,911	*Nil*	173	103,603	103,776	619,135

It will thus be seen that the consumption of the town of Bombay, for the shipping, mills, factories, railways, etc., has manifested extreme fluctuations, but may, on the whole, be regarded as improving. But *that* improvement has been chiefly in the increasing sea-borne imports of Bengal coal, with a slight increase in the supplies drawn by land routes from the Singareni mines, and not in any improvement in the foreign imports. A noticeable feature of the above analysis of the traffic with the town of Bombay is the steady decline in the rail-borne exports. This, as already remarked, may be taken as the direct result of the increased Indian production, penetrating to the mills and railways of the presidency in such quantity as to tell on the demands for English coal.

Comparing year by year the net consumption of Bombay town for the past five years, with the corresponding figures for Calcutta, it will be seen that the latter took from 97,183 to 323,626 tons per annum more than the Western capital. This to some extent is doubtless due to the extensive steamer traffic on the rivers of Bengal and Assam.

Madras Ports.

61. (*e*) Sea-port Towns of Madras Presidency are remarkable because of the small amounts of coal carried to them by the railways. This is doubtless due to their distance from the mines, but the fact is none the less significant. In 1890-91 the total rail-borne imports into these ports came to 1,076 tons and in 1894-95 it had expanded to 3,726 tons. An important feature of the modern returns is the growth of the supply drawn from the Singareni mines. In 1890-91 this came to 23 tons and in 1894-95 to 1,517 tons.

Bengal Province.

62. (*f*) The rail-borne imports of coal by the Province of Bengal have expanded from 45,565 tons in 1890-91 to 97,205 tons in 1894-95, an expansion of 113·11 per cent. The items of that supply last year were: Assam 57,703 tons and Calcutta 39,502 tons. The latter goes to the Railways of Eastern Bengal *viâ* Calcutta.

Madras Presidency.

63. (*g*) The rail-borne coal traffic of the Presidency of Madras has similarly manifested a considerable expansion. It stood at 31,408 tons in 1890-91 and had expanded to 157,998 tons in 1894-95, or an expansion of **403·05 per cent.** The imports of the former year were **9,599 tons** from the Nizám's Dominions and 21,688 from the seaports. Of the latter year they were **133,271 tons** from the Nizám's Dominions, and 23,908 tons from the port towns with small amounts from Mysore and Bombay. In the Presidency Singareni coal is thus rapidly displacing foreign coal, the expansion of the supply having been **1288·38 per cent.** during the past five years. As against these figures the exports from the Presidency may be characterised as nominal.

Panjab.

(*h*) The expansion of the Panjab supply by railway similarly manifests the drain that year by year is becoming heavier and more direct on the Indian production. In 1890-91 the Panjab imported 45,853 tons and in 1894-95, 100,444 tons, or an expansion of **119·06 per cent.** In the former year the supply was derived as follows:—39,255 tons from the North-West Provinces; 6,427 tons from Bengal; and 138

tons from Karachi (foreign coal). Last year the chief items of the supply were 80,844 tons from the North-West Provinces; 16,896 tons from Bengal; 2,136 tons from Bombay; 202 tons from Central India (Umaria coal); and 351 tons from Karachi.

PROVINCIAL: Central Provinces.

64. (*i*) In the Central Provinces the imports were in 1890-91, 49,614 tons, and in 1894-95, 73,300 tons, or an expansion of 47·74 per cent. The exports were, however, considerably in excess of these imports so that the Bengal mines and the Umaria mines may be supposed to have furnished coal to the districts in their neighbourhood, while the coal mines of Chanda and Narsinghpur more than restored the balance of the provincial requirements by their exports to other provinces.

Assam.

65. (*j*) Assam, from the table (*page 18*), will be seen to be distinctly an exporting province. In 1890-91 it exported by rail and river 68,809 tons and in 1894-95, 69,333 tons. The year 1891-92 showed, however, the highest record, namely, 97,478 tons exported. The imports, as already remarked, are drawn from Calcutta.

Rajputana.

66. (*k*) The rail-borne imports shown in the statement against Rajputana and Central India are approximately the supplies drawn by Rajputana. Central India with its Umaria mines is an exporting province. The subject of the Umaria mines has been so often alluded to already that it may be dismissed with the remark that the rail-borne trade of the past five years shows an expansion of 55·83 per cent.

Nizam's Dominions.

67. (*l*) The Nizám's Dominions rail-borne traffic may, like that of Central India, be dismissed with a few words. Repeated reference has been made to the rapidity with which the Singareni coal is finding its way over Madras and Bombay. The exports show an expansion of 210·96 per cent. during the past five years.

It may thus be admitted that the returns of the Rail and River-borne Traffic abundantly support the statement that Indian production is displacing imported coal. The growing demand demonstrates the rapid advancements that are being made in railway extension and the rise of a manufacturing enterprise that will sooner or later be felt in all the markets of the world.

IMPERIAL.

X.—FOREIGN TRADE IN COAL.

Exports of Indian Coal to Foreign Countries.

Bengal Coal exported to Foreign Countries.

68. By way of concluding this account of the coal production and trade of India it is desirable to give some further particulars of the Foreign Trade, *viz.*, to the countries to which Indian coal is exported and the foreign countries from which India's imports are derived.

Table showing the Exports of Bengal Coal to Foreign Countries, exclusive of Coke and Patent Fuel.

Year.	To Ceylon.		To China.		To Straits Settlements.		To Java.		To Mauritius and the West Indies.		To Arabia and Africa.		To other Countries.		Total.	
	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£
1890-91	15,157	150,947	*Nil*	*Nil*	5,869	59,667	4,000	40,000	575	5,712	*Nil*	*Nil*	702	7,044	26,303	263,372
1891-92	1,000	10,000	*Nil*	*Nil*	2,100	21,000	*Nil*	*Nil*	*Nil*	*Nil*	250	2,250	1,014	10,336	4,364	43,586
1892-93	13,379	136,230	*Nil*	*Nil*	3	150	*Nil*	*Nil*	1,518	13,358	*Nil*	*Nil*	720	7,050	15,620	155,788
1893-94	28,044	260,801	*Nil*	*Nil*	14,792	153,860	*Nil*	*Nil*	3,638	32,504	5,720	57,200	7	110	52,201	504,475
1894-95	47,820	442,901	*Nil*	*Nil*	5,277	52,845	*Nil*	*Nil*	*Nil*	*Nil*	368	3,680	100	800	53,565	500,226

It will be observed that the foreign exports are mainly to Ceylon. Coal goes to Colombo to meet the demands of the steamer traffic with India and the East generally. It is not consumed locally to any appreciable extent. But the supply thus met by Bengal used formerly to be drawn from Europe, so that the increasing shipments are a direct indication of the competition of the Indian with the European coal. The supply to the Straits Settlements is not very important and might be treated as a set-off against the very inferior coal that Japan supplies to Bombay.

69. The table given on page 13 will be found to manifest the amounts of coal drawn by the various provinces of India from foreign countries. It is desirable to give here the other view of that traffic, namely, the countries from which these imports are derived.

Table to show the Chief Foreign Countries from which India obtains Coal, Coke and Patent Fuel.

Foreign Countries whence obtained.

Countries.	1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
	Tons.	Tons.	Tons.	Tons.	Tons.
United Kingdom	760,306	716,665	627,032	531,043	775,017
Belgium	...	76	130	...	2,271
Germany	8	927	300	132	2,255
Cape Colony	60	233	180	47	245
Egypt	151	247	...	10	...
South America	10	40	1,087	103	1,194
Aden	176	250	143	193	...
Ceylon	653	483	56	369	4,424
Japan	12,014	4,720	1,900	11,331	8,531
Australia	10,017	12,585	16,942	11,155	27,767
Other Countries	1,269	745	415	897	1,610
Total	784,664	736,971	648,185	555,280	823,314

COAL: TRADE. IMPERIAL.

The supply furnished by the United Kingdom, which averages about 96 per cent. of the total, may be said to have shown indications of decline. This may be borne out by giving the figures for the five years previous to 1890-91 as follows:—From the United Kingdom in the year 1885-86, 746,554 tons; 1886-87, 730,813 tons; 1887-88, 810,489 tons; 1888-89, 813,821 tons; and in 1889-90, 552,071 tons. Fluctuations have thus taken place, but the average of the first half of the past decade (1885—1895) was distinctly higher than the average of the second half.

The table above would show the supply drawn from Australia to be improving, but if observation be carried further back, this is revealed as a false inference: thus imports by India from Australia 1885-86, 38,261 tons; 1886-87, 30,640 tons; 1887-88, 35,065 tons; 1888-89, 17,290 tons; and 1890-91, 45,320 tons. The second half of the past decade has thus marked a very considerable contraction in the Australian supply. But the trade from Japan to India (which goes to Bombay) manifests, on the other hand, a very considerable expansion. The first consignment was received in 1887-88, *viz.*, 1,550 tons, since which time it has shown many fluctuations but a general upward tendency.

COKE.

XI.—COKE AND PATENT FUEL.

70. In the above table coke and patent fuel have been combined with the returns of coal. The table, page 13, shows coal by itself and also the grand total, including coke, patent fuel and Government stores (*e.g.* imports of coal, coke, etc., on behalf of Government). It may, perhaps, be instructive as showing to what extent the Indian mines have contested the demand for coke and patent fuel to give here the returns of foreign imports for the past ten years. It may be remarked that up to the year 1893-94 the whole of the coke and patent fuel was obtained from the United Kingdom. In the year mentioned, however, South America furnished the quantity of patent fuel shown, and in 1894-95 Germany contributed 426 tons of coke, and Belgium 1,675 tons of patent fuel—

Years.	Coke in tons.	Patent Fuel in tons.
1885-86 . . .	11,375	20,487
1886-87 . . .	7,733	29,819
1887-88 . . .	10,554	38,164
1888-89 . . .	11,732	11,281
1889-90 . . .	9,765	19,114
1890-91 . . .	9,339	7,393
1891-92 . . .	12,766	10
1892-93 . . .	12,536	900
1893-94 . . .	11,257	17
1894-95 . . .	12,426	2,175

Mr. James Grundy in his *Report on the Inspection of Mines in India, 1895* page 111, says "coal and coke appear to be displacing timber for private and public cooking purposes in various parts of India. I am told that there is a fair demand and a steadily increasing market for crude coke, and that its use for the cooking and other fires in the up-country bazars is becoming extensive. I am also told that it is not unusual to work out coal at an all round cost of not more than ₹1-8 a ton; that good coal has sold at the pit as high as ₹5-4 to ₹5-8 a ton; and that a profit of ₹2 a ton was not thought to be excessive." (*Conf. with p.* 12).

The decline of the traffic in patent fuel is somewhat significant.

XII.—GOVERNMENT STORES IN COAL, COKE AND PATENT FUEL.

71. The demands of Government for foreign coal, coke, etc., are not very extensive and may be said to have been steadily declining for some years past:—

GOVERNMENT STORES.

Years.	Coal in tons.	Coke in tons.	Patent Fuel in tons.	Total in tons.
1890-91 . .	31,517	823	...	32,340
1891-92 . .	35,514	1,139	...	36,653
1892-93 . .	47,248	3,893	4,015	55,156
1893-94 . .	32,639	2,084	1,004	35,727
1894-95 . .	23,753	1,300	...	25,053

These Government imports are almost entirely consigned to Bombay with small quantities to Madras and Burma.

IRON: OCCURRENCE.

III.—IRON ORES (*Lohá, Hind.*).

XIII.—OCCURRENCE OF IRON ORES.

72. Iron Ores exist all over India, especially in Madras (as, for example, in the Salem, Bellary, and Kurnool districts); in the Central Provinces (about Warora and Jabalpur); and in the hilly districts of Western Bengal. In Bengal alone, however, where coal can be had in close proximity to the ore, is smelting carried on after European methods.

XIV.—PRODUCTION OF IRON.

IRON: PRODUCTION.

73. During 1895, the total production of Iron in India (see Statement I, *page 66*) was 45,819 tons. If compared with the previous year, that figure shows a considerable improvement in outturn of 19·35 per cent. and of 39·35 per cent. on the average of the three previous years.

There is, however, reason to believe that very little, if any, reliance can be put on these figures. It is even possible that some of the returns refer to iron ore, and others to crudely manufactured pig iron. It very possibly takes from 45 to 60 cwts. of iron ore to make one ton of pig iron*. Any confusion, therefore, of the nature indicated would render the statistics meaningless. But even were there no such error, the returns furnished would appear to be the actual records of certain transactions, which very possibly by no means denote the total production.

The primitive smelters scattered all over the country keep very little account of the amount of ore used by them in producing the crude iron which they dispose of to the local blacksmiths. So very general and widespread is this primitive smelting (of which it is believed no cognisance is taken in these returns) that it would be unsafe to assume that a province, shown in the Statement I. below, as producing no iron, has no local supplies of that metal. The absence of returns should rather be taken as denoting the absence of any large smelting furnaces. Though there are remarkably few furnaces in the provinces of India, nearly every town has foundries and workshops, where Indian or imported pig iron and scrap iron are worked up. It is, therefore, probable, at least for some time to come, that statistics of the foundries and Native smithies would afford a more tangible conception of the iron interests of India than is conveyed by the tabulation of actual returns of indigenous ore.

BENGAL.

74. *BENGAL.*—The production of this province has been given as 32,207 tons valued at ₹97,091, a valuation that would show the crude ore as costing ₹3-2-4 a ton. As compared with the returns of 1894, the production for the year under review would manifest an expansion of 30·08 per cent., or on the average of the three previous years of 30·26 per cent. The Barakar Iron Works may almost be spoken of as the only source of locally produced iron in the province. The actual figures furnished by the Government of Bengal are Burdwan district (Barakar) 31,848 tons, Hazaribagh 359 tons; with in addition 714 tons of black iron slag stone in Dacca and 481 tons of iron slag in Monghyr. The last two amounts have not been included in Statement No. 1 (*page 66*) as iron ore.

In the Financial and Commercial Statistics of British India for 1895 the Barakar Iron Works are shown to have given employment during that year to 870 persons and to have produced 16,798 tons of pig iron valued ₹9,03,843. As pointed out in last year's review, the production of iron ore in the Province of Bengal (as furnished to this office) will not agree with the published production of pig iron at the Barakar Works. If it be accepted that it takes 50 cwt.* of iron ore to yield one ton of pig iron, the consumption of ore at the Barakar Works must have been 41,995 tons or, say, 10,000 tons in excess of the total recorded production of ore for the entire province. Worked out from the data furnished by the Barakar Works their pig iron cost ₹53-12-11 per ton. The rail-borne returns in the Appendix (*page 79*) will be seen to manifest an export from Bengal of 8,594 tons of iron of which very nearly half was consigned to Calcutta and a little under that quantity to the North-West Provinces, the balance going to the Central Provinces and the Panjab. It may be assumed that the major portion of these provincial exports represent Barakar iron. During the same period Calcutta exported 62,789 tons of iron, a considerable proportion of which was doubtless imported pig iron. This cannot be definitely determined, however, since the distinction into the various classes of iron is not recorded. Of the Calcutta exports full half were consigned to the province of Bengal; very nearly one-third went to the North-West Provinces and a little under one-sixth to Assam, the balance being consigned to the Panjab, to the Central Provinces and to Central India.

CENTRAL PROVINCES.

75. *CENTRAL PROVINCES.*—Iron ore is chiefly obtained in Chanda, Narsinghpur, Bhandara, Raipur and Jabalpur. It has been pointed out by the reporting officer that the values returned for iron ore are extraordinarily discrepant, a fact doubtless due to some of the figures being intended to express crudely made pig iron and not iron ore. As already remarked, it is to be feared this error applies to a distinct percentage of all the provincial returns, and it might accordingly very possibly be commendable to abandon the tabulation of ore and to endeavour to procure statistics of locally produced iron. The ore is, in the majority of districts, found on the surface of the ground. The persons who collect it can give no trustworthy estimates either of the amounts so collected or of the prices obtained. Much of it is also crudely smelted before it reaches the recording centres, so that while given as ore by one officer it is correctly tabulated as iron by another. In a country, such as India, that possesses practically no smelting works, it will be readily recognised that an industry of picking up, and at odd times too, a block of iron ore here and another there, can never be estimated and tabulated with anything more than the merest approximation to truth. Instead of being regarded as actual returns of ore, the statistics given should rather be viewed as denoting the provinces and districts where the metal occurs.

Following the customary procedure it may, however, be stated that the production of 1895 denotes a decline equal to 4·38 per cent. on the record of 1894.

MADRAS.

76. *MADRAS.*—Iron ore of very high quality exists in great abundance in this province, and doubtless but for the difficulty of fuel Madras would by this time have developed into a vastly important iron-producing centre. With the opening of the East Coast Railway and the discovery of workable seams of coal with-

* A figure that is probably under the actual requirements; in a report furnished from Anantapur, Madras, it is stated that 5 tons of iron were obtained from 35 tons of ore.

IRON : PRODUCTION. MADRAS.

in practicable distance, great progress may be witnessed in the future. The actual amount of iron ore collected has been given as 2,828 tons. The districts that participated in that trade were Malabar (by far the most important so far as the figures indicate), Salem and Anantapur. The Native State of Sanduru is, however, shown as having produced a larger quantity than any of the above-mentioned districts. The total output given, however, for the Presidency presents a decrease of 6·05 per cent. on the production of 1894, but the reader, after having perused the remarks offered in connection with the Central Provinces, will see that no good can be expected by contrasting the figures of one year with those of another when they are submitted in both cases as "only rough guesses made by village officers."

77. It may be of interest to republish in this place a few passages from a very instructive paper published by Mr. T. H. Holland of the Geological Survey as showing the character of the Madras (Native) smelting—

"The manufacture of iron and steel, for which India has been celebrated for hundreds of years, is still practised in all its primitive rudeness in the southern districts of the Madras Presidency. In Malabar the industry is in the hands of Mahommedan Moplahs; in Trichinopoly men of the Karuman caste have, until recently, made wrought iron, but are now principally engaged in the production of wootz by the cementation in crucibles of wrought iron imported from the Salem district. In this latter district, and to a smaller extent in the north-west of Trichinopoly, Kattipariahs make wrought iron and steel; but the latter is made by an entirely different process from that of the crucible-steel or wootz of the Karumans.

MANUFACTURE OF WROUGHT IRON.

"Wrought iron is made direct from the ore by smelting with charcoal, the method, though extremely rude in all practical details, being in principle the same as in the Catalan process. Although steel is made by the decarburisation of cast iron, I have never come across any case of the indirect production of wrought iron by the removal of carbon, as in the refining and puddling of European 'pig' iron. The adoption of the direct process, whether accidental or not, is certainly not without its advantages, and, taking into consideration the material at the disposal of the Native worker, is perhaps preferable to the preliminary production of highly carburised 'pigs,' although, on the contrary, he suffers from heterogeneity of product. Iron ore is so very abundant that he may well despise the addition of fluxes; and the highly ferriferous and basic slag which consequently results has several advantages: (1) It aids in the removal of phosphorus when that element is present in the ore, or, as is sometimes the case, in the charcoal used. (2) The fusibility of the slag dispenses with the necessity of a high temperature for its removal, and thus there is an economy of fuel—the most important of all considerations—and at the same time a safeguard against carburisation. The scouring effect of basic slags on the furnace is quite immaterial to the Native, whose entire 'plant' might be purchased for a few annas, and who breaks down a considerable part of the structure at each operation of smelting a few pounds. As they use neither mineral coal nor pyritous ores, there is no fear of the introduction of sulphur. Neither the despised *pariah* nor the prouder but equally ignorant caste-man is aware that his ancestors and himself have been for so long a time working a combination of conditions which are comparatively new to Western civilisation, and only explained by the recent developments of chemical science."

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78. Some short time ago certain Madras iron ores were sent to the Research Department of the Imperial Institute, London, for the purpose of being examined.

The report recently came to hand and may be here published since it gives many interesting particulars as to the properties and values of these ores :—

Letter from SIR F. A. ABEL, BART., K.C.B., *Secretary and Director, Imperial Institute, to* GEORGE WATT, Esq., M.B., C.M., C.I.E., *Reporter on Economic Products to the Government of India,—No. 63, dated Imperial Institute, London, the 13th May 1896.*

I have the honour to forward herewith, for the information of the Government of India, the results of analysis of the samples of Indian iron ores (mainly from the Salem district), which form part of the collection in the Indian Section of the Imperial Institute.

These ores differ considerably from each other in regard to their richness in metal, but it will be seen that certain samples from Kanjamalai and Kollimalai rank high in this respect, the ores being, moreover, free from objectionable impurities.

Analyses of Indian Iron Ores.

A series of specimens was received some time ago from the Revenue and Agriculture Department of the Government of India, which represent the iron ores yielded by mines in the Madras Presidency, and chiefly from the mountain ranges in the vicinity of Salem.

The metal in these ores is, in all cases, in the form of oxides; the samples include varieties of magnetite, quartz-magnetite schist, and magnetic sand. They vary very considerably in richness; thus No. 793, from the northern flank of the Kollimalais, contains 70 per cent. of available iron, whilst a quartz-magnetite schist from the same locality contains only 30 per cent. of iron, and more than 50 per cent. of silica and gangue, insoluble in acids. The whole of the samples contain magnetic oxide, in various proportions, and in no case was any titanium found.

Phosphoric acid and sulphur are not present in any one instance in considerable proportions, and generally they are present as traces only.

Manganese is not present in more than minute quantities in any of the samples.

The method of examination pursued is as follows :—

A representative sample of the ore, reduced to very fine powder, was digested with *aqua regia*, and the insoluble residue, after ignition, weighed as silica and gangue.

In the filtrate were determined the remaining constituents.

The total iron was estimated by reduction and titration against standard bichromate in the usual manner, and, by means of a separate estimation of the ferrous oxide in a fresh sample of the ore, digested with hydrochloric acid in a neutral atmosphere, the amount of iron in the ferric state was arrived at.

The phosphoric acid and sulphur were determined in the ordinary way by precipitation with ammonium molybdate and 'magnesia mixture,' and with barium chloride, respectively.

The proportions of alumina present were arrived at by difference, the combined weights of ferric oxide and phosphoric acid being subtracted from the total precipitate obtained with ammonia.

Chemical Examination of Salem Ores.

The following is a description of the several samples of ore examined, with the analytical results furnished by each :—

Ore from Murugathee Malai, Attur Taluq, Salem District (No. 821).

Decomposed magnetite quartz schist, in fragments as mined by the native iron smelters.

The ore was laminated, and of a mottled appearance, showing portions which were respectively of a slate-brown, red and purple colour ; it was strongly magnetic ; very friable, being readily reduced to powder between the fingers, and when finely ground was of a light brown colour—

Hygroscopic moisture (at 110° C.)	0·28
Combined water	1·72
Silica and gangue	36·44
Ferrous oxide	6·78
Ferric oxide	53·75
Alumina	0·28
Lime	traces.
Phosphoric acid	traces.
Silica	0·68

From Kanjamalai, Salem District, Madras (813).

This ore was in small, slightly magnetic, glistening black flakes, with red-brown granules scattered through them—

Hygroscopic moisture (110° C.)	0·19
Combined water	0·91
Silica and gangue	48·45
Ferrous oxide	11·62
Ferric oxide	38·13
Phosphoric acid	0·62
Sulphur	0·29
Alumina	0·46

Magnetite from Kanjamalai, Salem District, Madras (815).

This sample was in small fragments, strongly magnetic, of a lustrous black crystalline appearance, coated in places with a red-brown non-crystalline substance—

Hygroscopic moisture (110° C.)	*Nil.*
Combined water	0·72
Sllica and gangue	1·72
Ferrous oxide	30·03
Ferric oxide	66·72
Alumina	0·82
Phosphoric acid	traces.
Sulphur	0·20

Magnetic iron ore-sand (852), obtained by washing crushed quartz magnetite schist, near *Wandur, Ernad Taluq, Malabar District.*

The sample was in the form of a coarse sand, which could be separated into three distinct groups : a dark-brown ore, slightly magnetic ; a black crystalline ore, strongly magnetic ; and silica. An average sample furnished the following results :—

Hygroscopic moisture	1·42
Silica and gangue	12·43
Ferrous oxide	14·26
Ferric oxide	70·34
Alumina	0·84
Phosphoric acid	0·14
Sulphur	0·24
Lime	0·28

Chemical Examination of Salem Ores.

Quartz magnetite schist (795), *from the Salem District*, mined by the native iron smelters on the northern flanks of the *Kollimalai*. This was a dark-grey friable and magnetic ore, with red-brown veins interspersed, and a large amount of siliceous matter—

Hygroscopic moisture	1·35
Silica and gangue	53·22
Ferrous oxide	4·14
Ferric oxide	41·00
Phosphoric acid	0·30
Sulphur	0·30
Alumina	0·12
Lime	0·30

Quartz magnetite schist (796), from the northern flanks of the *Kollimalai*, three miles south of *Namagiripett, Salem District*. Consists of layers of quartz containing crystalline greyish-black, strongly magnetic masses, interspersed with a non-crystalline and non-magnetic mineral varying in colour from red-brown to red. This sample was very friable—

Hygroscopic moisture	0·67
Silica and gangue	53·98
Ferrous oxide	4·96
Ferric oxide	40·44
Phosphoric acid	traces.
Alumina	traces.
Sulphur	0·22

Magnetite sand (809), from *Mathurulii*, four miles west of *Mallikari, Attur Taluq, Salem District*. The sample, which was described as "prepared for the furnace," consisted of a pulverised mixture of highly magnetic black particles, with a large amount of siliceous matter, and a small proportion of reddish-brown grains—

Hygroscopic moisture	0·69
Silica and gangue	6·51
Ferrous oxide	14·09
Ferric oxide	77·51
Alumina	1·15
Sulphur	0·19
Phosphoric acid	...

Quartz magnetite schist (850), mined for the deposit by *Moplahs* near *Wandur, Ernad Taluq*. This sample was in yellowish-brown fragments, with small patches of a darker-brown crystalline substance, and much siliceous matter. It was of a sandy friable nature, and the darker portions were magnetic—

Hygroscopic moisture	3·60
Silica and gangue	34·96
Ferrous oxide	13·91
Ferric oxide	46·40
Phosphoric acid	traces.
Alumina	0·93
Lime	traces.
Sulphur	0·12

Quartz magnetite schist (810), from *Kollimalais, Salem District*. The sample was described as obtained by crushing and sifting the decomposed magnetite schist. It was a red-brown coarse powder containing particles, with glistening facets, which were strongly magnetic—

Hygroscopic moisture	0·70
Silica and insoluble	3·43
Ferrous oxide	17·36
Ferric oxide	77·95
Sulphur	0·26
Alumina	0·98
Phosphoric acid	...

Magnetite from Kanjamalai, Salem District (873). This blackish-brown sample was roughly crushed; the greater portion was strongly magnetic, and this, when separated from the rest by means of a magnet, was a black crystalline mineral. The remainder was of light brown colour and contained siliceous matter—

Hygroscopic moisture	0·95
Silica and gangue	8·89
Ferrous oxide	17·72
Ferric oxide	70·98
Alumina	1·18
Phosphoric acid	trace.
Sulphur	0·29

Crushed and sifted ore (800), from *Mamagiripett, Salem District*. It was a reddish-brown, strongly magnetic powder—

Hygroscopic moisture	0·73
Ignited insoluble residue	1·74
Ferrous oxide	17·68
Ferric oxide	78·07
Alumina	1·49
Sulphur	0·89
Phosphoric acid	...

Crushed quartz-magnetite schist (*851*), from near *Wandur, Ernad Taluq, Malabar District.* A roughly powdered yellowish-brown ore, magnetic, and containing a considerable quantity of siliceous matter—

Hygroscopic moisture	2·16
Ignited insoluble residue	32·46
Ferrous oxide	6·35
Ferric oxide	57·37
Alumina	0·90
Phosphoric acid	...
Lime	0·41
Sulphur	0·20

Crushed and sifted ore (*808*), from *Mathurulii, Attur Taluq, Salem District.* This was greyish-black, crystalline, and strongly magnetic; a small quantity of a yellowish-brown ore, and a considerable amount of siliceous matter was distributed thro ugh it—

Hygroscopic moisture	0·72
Ignited insoluble residue	14·26
Ferric oxide	68·12
Ferrous oxide	16·10
Alumina	0·21
Phosphoric acid	...
Sulphur	0·19
Manganese and lime	traces.

Magnetite (*799*), from *Kanjamalai, Salem District.* A blackish-grey, lustrous, strongly magnetic mineral, containing small patches of a white substance, which were aluminium and calcium phosphate—

Hygroscopic moisture	0·59
Ignited insoluble residue	1·04
Ferrous oxide	20·97
Ferric oxide	75·20
Alumina	2·45
Phosphoric acid	0·30
Sulphur	0·16
Manganese and lime	traces.

Magnetite sand (*801*), from *Mathurulii, Attur Taluq, Salem District.* The sample was in the form of a fine black powder, having been prepared for furnace-treatment; it contained a small quantity of yellowish-brown siliceous particles, and was strongly magnetic—

Hygroscopic moisture	0·72
Ignited insoluble residue	9·56
Ferrous oxide	11·67
Ferric oxide	77·64
Alumina	0·24
Phosphoric acid	traces.
Sulphur	0·25

Ore, as mined by the native smelters (*802*), from the northern flanks of the *Kollimalais, Salem District*—

Hygroscopic moisture	1·10
Ignited insoluble residue	45·19
Ferrous oxide	2·07
Ferric oxide	51·10
Alumina	0·86
Phosphoric acid	...
Sulphur	0·13

From Kanjamalai (*874*), *Salem District.* A roughly powdered sample, consisting of a blackish-brown magnetic mineral, mixed with a red-brown variety—

Hygroscopic moisture	1·72
Ignited insoluble residue	3·17
Ferrous oxide	23·73
Ferric oxide	69·29
Alumina	2·16
Phosphoric acid	...
Lime	...
Sulphur	0·09

From the northern flank of *Kollimalais* (*793*), three miles south of *Namagiripett, Salem District.* A purplish-grey, strongly magnetic massive ore, with a small amount of a red-brown powder scattered through it. It was generally of a flaky crystalline appearance when freshly broken—

Hygroscopic moisture	0·52
Ignited insoluble residue	0·55
Ferrous oxide	22·38
Ferric oxide	74·77
Alumina	1·00
Phosphoric acid	traces.
Lime and manganese	traces.
Sulphur	0·30

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Similar ore to No. 802, from *Kanjamalai, Salem District* (*812*). It was crystalline grey-black, slightly magnetic, and contained a small amount of a brown non-crystalline powder—

Hygroscopic moisture	1·02
Ignited insoluble residue	46·95
Ferrous oxide	3·56
Ferric oxide	48·10
Alumina	0·61
Sulphur	0·10
Phosphoric acid	...

From *Walluvanad Taluq, Malabar District* (*848*). This was a granular and very friable ore, partly of a purplish-grey colour, and partly dark-red and amorphous. It was slightly magnetic—

Hygroscopic moisture	0·60
Ignited insoluble residue	45·94
Ferrous oxide	6·67
Ferric oxide	46·03
Alumina	0·42
Sulphur	0·10
Lime	...

The following is a tabulated summary of the percentage composition of the several samples. A column has been added, giving the total amount (per cent.) of iron in each sample:—

Summary of Results of Chemical Investigations.

Serial Number.	Description.	Locality.	Available Iron.	Water.	Ignited Insoluble Residue.	Ferrous Oxide.	Ferric Oxide.	Phosphoric Acid.	Alumina.	Lime.	Sulphur.
799	Magnetite	Kanjamalai, Salem District	68·95	0·59	1·04	20·97	75·20	0·30	2·45	...	0·16
812	Ditto	Ditto ditto	36·44	1·02	46·95	3·56	48·10	...	0·61	...	0·10
813	Ditto	Ditto ditto	35·73	1·10	48·45	11·62	38·13	0·62	0·46	...	0·29
815	Ditto	Ditto ditto	70·06	0·72	1·72	30·03	66·72	...	0·82	...	0·20
873	Ditto	Ditto ditto	63·57	0·95	8·89	17·72	70·98	...	1·18	...	0·29
874	Ditto	Ditto ditto	66·96	1·72	3·17	23·73	69·29	...	2·16	...	0·10
793	Ditto	Northern flanks of Kollimalais, 3 miles S. of Namagiripett, Salem.	69·75	0·52	0·55	22·38	74·77	...	1·00	...	0·30
802	Ditto	Northern flanks of Kollimalais, Salem District.	37·38	1·10	45·19	2·07	51·10	...	0·86	...	0·13
848	Ditto	Walluvanad Taluq, Malabar District.	37·63	0·60	45·94	6·67	46·03	...	0·42	...	0·10
800	Magnetite 'sifted'	Namagiripett, Salem District.	68·40	0·73	1·74	17·68	78·07	...	1·49	...	0·89
808	Ditto ditto	Mathurulii, Attur Taluq, Salem District.	60·21	0·72	14·26	16·10	68·12	...	0·21	...	0·19
810	Ditto ditto	Kollimalais, Salem District	68·06	0·70	3·43	17·36	77·95	...	0·98	...	0·26
795	Quartz-Magnetite Schist.	Northern flanks of Kollimalais, Salem District.	31·92	1·35	53·22	4·14	41·00	0·30	0·12	0·30	0·30
796	Ditto ditto	Northern flanks of Kollimalais, 3 miles S. of Namagiripett, Salem District.	32·17	0·67	53·98	4·95	40·44	...	...	...	0·22
821	Ditto ditto	Murugathii Malai, W.-S.-W. of Attur, Salem District.	42·93	2·00	36·44	6·78	53·75	...	0·28	...	0·68
850	Ditto ditto	Wandur, Errad Taluq, Malabar District.	43·30	3·60	34·96	13·91	46·40	...	0·93	...	0·12
851	Ditto ditto	Ditto ditto	45·10	2·16	32·46	6·35	57·37	...	0·90	0·41	0·20
852	Magnetic Sand	Ditto ditto	60·33	1·42	12·43	14·26	70·34	0·14	0·84	0·28	0·24
801	Ditto ditto	Mathurilii, Attur Taluq, Salem District.	63·43	0·72	9·56	11·67	77·64	...	0·24	...	0·25
809	Ditto ditto	Mathuritlii, 4 miles W. of Mallikari, Attur Taluq, Salem District.	65·22	0·69	6·51	14·09	77·51	...	1·15	...	0·10

79. The *Madras Mail* recently commented on the somewhat conflicting reports that had been published regarding the percentage of iron obtained from the Salem ores. It urged with much force that the first step in the direction of developing the iron production of the Presidency should be a re-examination of a representative series of samples. The following passages exemplify the contention while giving some interesting particulars of the Kanjamalai ore. "At the present time, of all the vast deposits of iron ore which are scattered over this Presidency, the interest mainly centres in those of Kanjamalai, which are situated within

a quarter of a mile of the Madras Railway and are therefore easily accessible. Native iron smelters have derived their supplies of ore from these beds, and the Porto Novo Iron Company used Kanjamalai ore in the blast furnaces it for a time worked at Pulampatti, on the Cauvery, and now some steps have been taken to send a sample consignment of the ore to England for trial. The ore is magnetite, which, when pure, contains 72·4 per cent. of iron, and it is generally supposed that the iron beds of Kanjamalai are of exceptional purity besides being of enormous extent. According to Mr. William Maylor, who was at one time Manager of the Porto Novo Iron Company, the yield of the Pulampatti furnaces averaged 54 per cent.; and Mr. T. H. Holland confidently asserts that there is a practically inexhaustible supply of ore containing 60 per cent. of iron, but Mr. C. S. Middlemiss, in his report on 'The Magnetite† areas near Salem', gives the results of analyses of some specimens from the lowest and thickest band of the magnetite schist at the south foot of Kanjamalai which he considered to be fair average specimens of the whole deposit, and these only yielded a little over 35 per cent. of pure iron."

Schemes for Development of supplies.

The *Mail*, while discussing the various proposals that have been made on the utilisation of the South Indian supplies of iron ore, further remarked :—"The schemes which have been put forward for the utilisation of Kanjamalai ore are reducible to three, of which the smallest, but at present the most promising, is the manufacture of pig iron from locally produced charcoal. Sufficient fuel can be provided from the forest reserves to keep two blast furnaces going, the outturn from which would be about 20,000 tons per annum and worth on the spot ₹50 a ton. Its success depends essentially on the Forest Department, and as all the raw materials belong in the first instance to Government, and can only be supplied by Government, it is a project which can only be carried to a successful issue when cordially supported, not only by Government but by its local officers also."

"The other schemes are of much greater magnitude and both involve the transport of the ore to Madras. The export of ore to England will either never take place, or will do so on a gigantic scale. It is purely a question of cost of transport, and the ultimate issue will very largely depend on the railway freight from Ariyanur to Madras and the cost of loading into steamers. The third proposal involves the simultaneous establishment of iron works and rolling mills in Madras and Bengal, and the employment of special steamers to carry Madras ores to Bengal and return with Bengal coke for the Madras furnaces. There are beds of similar ore in the Ongole Taluq of the Nellore District which have long been used by native iron smelters and which are reputed to be of great richness. The proximity of these deposits to the coast may prove an important factor in the development of the iron industry, and they merit an early and thorough examination."

The results obtained at the Research Department of the Imperial Institute show a considerable range in the value of the ores represented by the 20 samples examined. Out of six, however, from Kanjamalai, four contained over 63 per cent. of available iron, the other two 36·44 and 35·73, respectively.

80. ***NATIVE STATES.***—It will be seen from Statement I (*page 66*), that the States of the Central Indian Agency return their production 2,653 tons or a slight decrease from that of 1894 though an expansion on the average for the three previous years, equal to 25·79 per cent. Doubtless this is due as much to greater accuracy in tabulation as to any such expansion in production. The supply was obtained chiefly from Sabalgarh (in Gwalior) and Bijawar and Chhatarpur in Bundelkand. Rajputana showed a slight increase from 774 tons in 1894 to 855 tons in 1895 or 10·47 per cent. The supply was mainly obtained from Ulwar, Meywar and Bandwara.

The most noticeable feature of the iron ore returns of Native States is the very greatly enhanced production of Mysore, namely, 1,335 tons or an expansion of 37·35 per cent. on last year.

XV.—FOREIGN TRADE IN IRON AND IRON MANUFACTURES.

81. As having a distinct bearing on the future prospects of the Indian indigenous iron industries, it may be useful to give some statistics of the foreign traffic in iron and iron manufactures :—

Imports of Iron and Iron Manufactures.

DESCRIPTION OF ARTICLE.	1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
	₹	₹	₹	₹	₹
Iron, wrought and unwrought .. .	28,024,022	25,559,937	27,358,470	26,934,722	24,931,251
Steel	4,896,496	4,836,813	4,134,884	6,500,891	6,123,621
Hardware and Cutlery*	12,795,705	13,479,007	13,412,774	14,245,653	14,518,428
Machinery and Millwork	21,604,832	21,800,188	24,778,351	26,070,281	25,560,513
Railway plant	32,367,859	25,054,709	23,219,895	23,345,628	28,031,850
TOTAL .	99,688,914	90,730,654	92,904,374	97,097,175	99,165,663

* The figures of hardware and cutlery include electroplate which, strictly speaking, should not appear under iron.
† Is there not a confusion here between magnetite and magnesite?

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82. By way of illustrating the nature of certain of these foreign imports the following passages may be republished from Mr. J. E. O'Conor's *Review of the Trade of India in 1894-95* :—

"*Iron and Steel.*—The imports for the last ten years are given below :—

Increased demand for Steel.

	Iron. Cwt.	*Steel.* Cwt.
1885-86	3,493,179	278,788
1886-87	3,280,389	349,317
1887-88	4,321,587	420,927
1888-89	4,002,793	542,388
1889-90	3,608,405	468,396
1890-91	3,876,556	715,465
1891-92	3,680,489	773,036
1892-93	3,596,239	621,556
1893-94	3,709,617	1,039,819
1894-95	3,250,403	905,333

"The imports of iron have fallen to a lower level than has been known for more than a decade. It is not at all likely that the import duty—which is assessed at only one per cent. *ad valorem* on the great bulk of the imports—can have had any influence on the trade. There are, however, other factors at work to prevent the growth of the imports of iron: pig iron and castings made at Barakar interfere with the development of those classes of imported iron; ready-made tools and implements are being imported instead of the raw material from which such implements were fashioned by crude native methods; the railway companies sell each year larger quantities of old iron and scrap which are taken in preference to material imported direct, because they are supposed, no doubt with reason, to possess a guarantee of quality in the fact that they have been used on a railway line or in a railway workshop; and lastly, for certain classes of goods, steel has rapidly superseded iron in recent years, as a glance at the foregoing figures will show."

"The imports of steel were rather smaller than in 1893-94, but the trade in that year was quite exceptionally large, and even the reduced quantity imported in 1894-95 is markedly in excess of the trade of any preceding year. Indeed, the progress of this trade is remarkable."

"The following are the principal forms in which iron and steel are imported :—

Chief items of Iron and Steel Imports.

Iron.	1893-94. Cwt.	1894-95. Cwt.	*Steel.*	1893-94. Cwt.	1894-95. Cwt.
Bars	1,047,941	543,915	Bars	502,798	337,120
Galvanised	489,415	539,943	Sheets and plates	204,281	149,867
Sheets and plates (including tinned plates)	461,041	436,957*	Hoop	194,674	165,048
Pipes and tubes	443,239	380,975	Cast	16,191	8,178
Angle, bolt, and rod	406,601	525,504			
Beams, pillars, girders, and bridgework	256,679	271,168			
Pig	147,724	158,739			
Nails, screws, and rivets	144,733	143,599			
Hoop	90,612	79,174			

* Of which 79,000 cwt. represent tinned plates.

"Belgium and Germany continue to compete actively in India with iron and steel of British manufacture, and the figures in the subjoined table, which show the extent of the competition, merit attention :—

Decline British supplies.

YEAR.	FROM UNITED KINGDOM.		FROM BELGIUM.		FROM GERMANY.		FROM OTHER COUNTRIES.	
	Iron.	Steel.	Iron.	Steel.	Iron.	Steel.	Iron.	Steel.
1883-84	3,473,619	240,149	86,657	10,981	9,411	1,609	13,975	687
1884-85	3,423,559	263,433	165,488	24,287	5,209	1,400	8,020	808
1885-86	3,322,511	255,871	152,069	20,629	4,146	1,850	14,493	438
1886-87	3,102,856	327,744	162,043	19,240	3,922	2,154	11,568	179
1887-88	4,077,292	372,824	188,584	42,913	8,148	3,283	47,563	1,907
1888-89	3,715,081	456,550	262,436	77,976	11,928	7,063	13,348	799
1889-90	2,983,080	385,916	606,544	66,375	5,425	16,099	13,356	6
1890-91	3,306,381	462,671	536,076	164,874	13,134	76,235	20,965	1,685
1891-92	2,859,753	347,816	776,328	301,573	28,559	123,086	15,849	561
1892-93	2,382,578	270,751	1,153,411	283,817	34,727	66,712	25,523	276
1893-94	2,320,839	420,158	1,223,332	518,395	102,334	100,188	63,112	1,078
1894-95	1,956,721	369,753	1,176,179	448,091	75,264	84,083	42,239	3,406

83. The exports of iron and iron manufactures from India to foreign countries are not important. The following figures represent the value of these exports during the past five years:—

IMPERIAL:

Exports of Iron and Manufactures therof. ***(Indian Produce and Manufactures.)***

DESCRIPTION OF ARTICLE.	1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
	₹	₹	₹	₹	
Iron, wrought and unwrought . . .	91,696	86,963	97,620	80,056	69,223
Steel	...	...	...	...	...
Hardware and Cutlery*	102,579	109,951	99,078	84,042	134,324
Machinery and Millwork	6,179	1,246	2,940	540	6,610
Railway plant	...	...	...	...	...
TOTAL .	200,454	198,160	199,638	164,638	210,162

Indian Exports to Foreign Countries.

* See foot note, page 29.

XVI.—INTERNAL TRADE IN IRON.

PROVINCIAL.

84. ***RAIL AND RIVER-BORNE TRADE.***—As customary in other cases, the subject of Internal Trade practically resolves itself into a criticism of the figures shown under rail and river-borne traffic and in the returns of coastwise trade. The details of local transactions passing by road, from the hill tribes who collect the ore, to the village blacksmith, are practically beyond the scope of this review. We may speculate as to the possible amounts so used up. but we can procure no statistics that could be regarded as trustworthy until the smelting of ore assumes the proportions of furnaces and foundries. With an inexhaustible supply of ore it is somewhat significant that so little progress has been made in this direction.

The following analytical statement may be given of the rail-borne transactions returned under the heading of iron during the past five years. These show the imports; but as the exports of one province are imported by another or others, it is perhaps unnecessary in the case of iron to show side by side the exports:—

Rail-borne Imports of Iron by the Provinces, Native States and Chief Port Towns, during the five years 1890—95.

Rail and River.

	1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
British Provinces. (*Excluding Chief Seaports*).	Tons.	Tons	Tons.	Tons.	Tons.
Bengal	30,117	50,211	50,348	47,531	41,846
Bombay	33,955	31,239	33,342	36,390	35,398
Sind	2,543	2,851	1,035	1,966	1,357
Madras	20,843	19,791	27,489	23,925	17,006
North-West Provinces and Oudh . .	32,003	36,405	48,661	55,794	26,841
Panjab	35,657	36,407	28,865	27,616	29,881
Central Provinces	6,671	10,607	13,825	8,522	8,419
Berar	6,461	4,924	5,511	4,666	3,759
Assam	6,994	7,054	7,870	7,303	6,769
Total .	175,244	199,489	216,946	213,713	171,276
Native States.					
Rajputana and Central India . . .	11,257	13,577	12,839	10,245	9,208
Nizám's Territory	3,943	4,219	4,154	5,071	10,490
Mysore	7,241	7,949	8,511	10,487	8,466
Total .	22,441	25,745	25,504	25,803	28,164
Chief Seaports.					
Calcutta	5,449	5,612	7,771	7,668	4,614
Bombay	1,135	2,300	1,793	816	1,445
Karachi	424	441	319	262	170
Madras ports	3,312	5,201	3,371	3,684	1,657
Total .	10,320	13,554	13,254	12,430	7,886
Grand Total .	208,005	238,788	255,704	251,946	207,326

IRON : TRADE.

PROVINCIAL.

In the Statement in the Appendix (*pages 78-81*) full details of the figures for last year are given. It will there be seen that Bengal heads the list of importing provinces, having last year secured 41,816 tons of iron. By far the most important item of that supply appears as an export from Calcutta. Next in importance comes the Presidency of Bombay with the total imports 35,398 tons, of which, as in the case of Bengal, the major portion was derived from the port town of Bombay. In both these cases, therefore, it may be assumed these figures indicate mainly, if not entirely, supplies drawn from the foreign imports. Following Bombay usually comes the North-West Provinces with last year an import of 26,841 tons fully one half of which was derived from Calcutta, the balance from Bombay, Bengal Province, Karachi and the Central Provinces. In this case also the supplies obtained from Calcutta, Bombay and Karachi may be accepted as foreign iron. The Panjab received 29,881 tons, procured almost entirely from Karachi. Madras stands as the next in order of importance as a receiving province, *viz.*, 17,006 tons. Of that amount Madras port furnished nearly the whole, the balance being derived from Bombay and Mysore.

Port towns supply Foreign Iron.

We thus learn from the study of the rail-borne imports and exports that during the year 1894-95 the chief port towns of India exported to their adjacent provinces 178,987 tons of iron. The imports from foreign countries of iron and steel (*see page 30*) came to 207,326 tons. These figures may, therefore, be placed alongside of the reported production of the Barakar Iron Works, *viz.*, 16,798 tons as denoting the present necessities of this country and the extent to which these are met by local production. And the returns given as iron by no means convey a complete conception of the future possibilities of this industry. For that purpose it is necessary to take into consideration the facts brought out by the table of foreign imports (*page 29*) of iron and iron manufactures which last year were valued at ₹99,165,663. From the imports of iron manufactures alone, a continuous supply is created of old and scrap iron, which is being more and more utilized by the indigenous industries.

Coastwise.

85. ***COASTING TRADE IN IRON.***—By way of completing this statement of India's trade in Iron it is only necessary to give here some particulars of the amounts of foreign and Indian iron that is distributed throughout the country by means of the coastwise shipping :—

Coastwise Trade in Iron—Imports.

Year.	Description.	Into Bengal.	Into Bombay.	Into Sind.	Into Madras.	Into Burma.	Total.
		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1890-91	Indian	31	504	56	68	20	679
	Foreign	796	10,618	1,196	5,071	2,100	19,781
1891-92	Indian	178	1,112	17	196	64	1,567
	Foreign	3,779	4,920	1,677	6,154	1,914	18,444
1892-93	Indian	98	813	19	194	70	1,194
	Foreign	3,962	4,332	812	5,302	2,674	17,082
1893-94	Indian	70	606	7	336	34	1,053
	Foreign	990	4,559	955	5,163	2,117	13,784
1894-95	Indian	109	584	25	257	62	1,037
	Foreign	2,066	4,295	1,003	3,871	2,095	13,330

Coastwise Trade in Iron—Exports.

Year.	Description,	From Bengal.	From Bombay.	From Sind.	From Madras.	From Burma.	Total.
		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1890-91	Indian	166	853	9	80	1	1,109
	Foreign	1,647	16,255	811	824	1,312	20,849
1891-92	Indian	859	856	3	32	3	1,753
	Foreign	1,703	16,192	325	3,367	1,658	23,245
1892-93	Indian	549	895	57	27	5	1,533
	Foreign	2,189	14,592	224	1,831	2,083	20,919
1893-94	Indian	605	1,342	1	29	2	1,979
	Foreign	1,978	18,998	247	827	1,762	23,812
1894-95	Indian	464	1,183	32	163	11	1,853
	Foreign	2,069	13,784	243	361	1,402	17,859

PETROLEUM.

IV.—PETROLEUM (*Mitti-ka-tél, Hind.*).

XVII.—PRODUCTION OF PETROLEUM IN INDIA.

86. The provinces of India that produce Petroleum are Burma, Assam, the Panjab and Baluchistan. In the last two production may, however, be said to have ceased. Operations have been en-

tirely discontinued in Baluchistan, and in the Panjab the production last year was only 1,560 gallons or 10·45 per cent. less than in 1894, and 19·30 per cent. less than the average of the past three years. These two known regions of production may, therefore, be regarded as fully disposed of by these remarks. PRODUCTION.

87. ***BURMA.***—It is stated the oil has been obtained in this province for the past 2,000 years. The production last year (*page 67*) was **12,975,995 gallons** or an increased production of **18·82 per cent.** on the previous year and **30·21** per cent. on that of the average of the past three years. This is certainly a very satisfactory result and if a continuous supply and expansion, such as that secured last year, can be maintained, the industry may be regarded as exceedingly prosperous. The increased output is said to be due to some extent to new operations. It may be localised as 11,927,544 gallons from the Magwe district, 846,262 gallons from Pokokku district, 148,539 gallons from the Kyaukpyu district, and 53,650 gallons from Akyab.

88. ***ASSAM.***—The decline in production shown in the Statement (*page 67,*) which comes to 78·17 per cent. on the production by 1894 and 59·58 on that of the average of the past three years, is explained as due to the fact that no oil was extracted by the Assam Oil Syndicate during the year. The Assam Railway and Trading Company also did not extract so much oil as in the previous year owing to the erection of their refinery not having been completed. ASSAM.

There is thus very little to comment, on the Indian source of Petroleum, in addition to what will be found in last year's review. Following the system pursued with salt, coal and iron an effort may, however, be made to exhibit last year's returns of the trade in petroleum and kerosine oil.

XVIII.—PROSPECTS OF INDIAN PETROLEUM.

89. If it be found possible to produce this oil at paying rates and in sufficient quantity, the home market would be almost limitless. The consumption of mineral oil in India is increasing with marvellous rapidity. The imports of foreign mineral oils rose from a valuation of ₹598,797 in 1870-71 to ₹4,870,580 in 1880-81 and to ₹8,518,279 in 1885-86. TRADE: IMPERIAL.

90. The FOREIGN IMPORTS during the five years ending 1894-95 were as follows :— Foreign Imports.

Imports of Kerosine and other Mineral Oils.

YEARS.	Gallons.	₹
1890-91 . . .	54,235,275	23,622,192
1891-92 . . .	58,109,283	23,681,405
1892-93 . . .	67,085,968	26,902,640
1893-94 . . .	86,608,568	32,755,852
1894-95 . . .	53,441,425	21,229,994

It will thus be seen that last year manifested a decline of imports that came to **38·3 per cent.** on the quantity and 35·19 per cent. on the value as compared with the imports of 1893-94.

XIX.—INTERNAL TRAFFIC IN PETROLEUM.

91. From the analytical Statement shown in the Appendix (*pages 82-3*) it will be seen that **24,618,008 gallons** of oil were carried on the railways and rivers of India during the year. Bengal was the largest importing province having taken **5,912,064 gallons,** of which practically the whole was received from Calcutta. After Bengal the North-West Provinces and Oudh would appear to be the most important province, the imports of which were **4,125,168 gallons** of which the Bengal Province, and not Calcutta, was the chief source of supply. The Panjab, by last year's transactions, would appear the third most important receiving province. It draws its supplies almost entirely from Karachi. Bombay Presidency may be spoken of as fourth with 2,141,760 gallons derived exclusively from the port town. The Central Provinces fifth in order of demands 2,109,832 gallons, the supply being derived mainly from Bombay. It is perhaps hardly necessary to mention other particulars except that the exporting centres are as follows :—Calcutta, 6,841,680 gallons; Bombay port town, 5,527,776 gallons; Madras, 2,220,784 gallons; and Karachi, 1,760,864 gallons. PROVINCIAL.

Coastwise Traffic in Kerosine Oil and other Mineral Oils.

Imports.

92. By way of concluding this statement of the Indian trade in kerosine and other mineral oils, it is only necessary to give a few details of the coastwise transactions :— Coastwise.

Year.	DESCRIPTION.		Into Bengal.	Into Bombay.	Into Sind.	Into Madras.	Into Burma.	TOTAL.
			Gals.	Gals.	Gals.	Gals.	Gals.	Gals.
1890-91 . .	Kerosine . .	Indian . .	42,512	...	...	560	...	43,072
	Ditto . .	Foreign . .	526,179	2,020,874	517,456	1,550,850	400,059	5,015,418
	Other kinds .	Indian . .	773,170	4,183	...	10,355	183,599	971,307
	Ditto . .	Foreign . .	3,649	3,053	....	1,339	1,070	9,111

PETROLEUM:

TRADE.

Provincial.

Year.	Description.		Into Bengal.	Into Bombay.	Into Sind.	Into Madras.	Into Burma.	Total Imports.
			Gals.	Gals.	Gals.	Gals.	Gals.	Gals.
1891-92	Kerosine	Indian	21,017	...	...	3,034	...	24,051
	Ditto	Foreign	681,197	1,907,229	48,944	1,560,444	464,597	4,662,411
	Other kinds	Indian	1,131,112	5,352	...	11,716	254,268	1,402,448
Coastwise Traffic.	Ditto	Foreign	3,080	27	913	10,508	4,560	19,088
1892-93	Kerosine	Indian	...	...	...	53,115	84,072	137,187
	Ditto	Foreign	652,810	3,144,367	43,886	1,898,697	509,894	6,249,654
	Other kinds	Indian	1,197,467	5,328	...	23,074	230,197	1,456,066
	Ditto	Foreign	2,229	780	503	16,252	10,190	29,954
1893-94	Kerosine	Indian	...	...	...	4,932	188,408	193,340
	Ditto	Foreign	619,094	3,421,391	394,672	2,756,085	442,436	7,633,678
	Other kinds	Indian	1,376,402	4,971	...	16,530	195,456	1,593,359
	Ditto	Foreign	4,579	408	4,486	27,300	8,385	45,158
1894-95	Kerosine	Indian	355	...	...	11,838	240,326	252,519
	Ditto	Foreign	303,123	3,663,583	420,608	1,657,117	387,621	6,432,052
	Other kinds	Indian	1,529,093	20,265	...	25,518	247,645	1,822,521
	Ditto	Foreign	11,308	713	789	31,591	9,327	53,728

Exports.

			From	From	From	From	From	Total Exports.
1890-91	Kerosine	Indian	5,831	...	...	400	1,010,611	1,016,842
	Ditto	Foreign	569,204	6,288,130	18,596	116,138	387,702	7,379,770
	Other kinds	Indian	...	...	...	...	...	...
	Ditto	Foreign	55	16,235	80	112	666	17,148
1891-92	Kerosine	Indian	2,867	...	...	4	...	2,871
	Ditto	Foreign	765,627	6,003,240	50,779	132,401	459,263	7,411,310
	Other kinds	Indian	5,045	...	...	...	1,430,580	1,435,625
	Ditto	Foreign	540	20,725	...	125	4,281	25,671
1892-93	Kerosine	Indian	364	...	...	224	171,679	172,267
	Ditto	Foreign	696,261	7,535,020	496,388	49,592	475,242	9,252,503
	Other kinds	Indian	3,500	...	...	...	1,456,103	1,459,603
	Ditto	Foreign	18,229	32,391	...	558	275	51,453
1893-94	Kerosine	Indian	...	...	...	112	285,776	285,888
	Ditto	Foreign	762,202	10,525,863	31,489	74,594	405,395	11,797,543
	Other kinds	Indian	6,294	...	...	...	1,582,724	1,589,018
	Ditto	Foreign	8,225	61,261	47	76	3,388	72,997
1894-95	Kerosine	Indian	...	...	...	462	359,288	359,750
	Ditto	Foreign	359,581	8,310,399	114,489	142,231	358,744	9,285,444
	Other kinds	Indian	12,245	...	...	...	1,799,858	1,812,103
	Ditto	Foreign	26,842	68,895	750	97	2,093	98,677

In the above tables it will be observed the effort has been made to distinguish Indian from foreign Petroleum.

Statement II.

MINERALS REGARDING WHICH DEFINITE STATISTICS CANNOT BE FURNISHED.

93. The information called for under this heading was intended to amplify, and, if possible, bring up to date the returns published in previous Reviews regarding the more important minerals for which definite statistics are not available. The returns for the year 1895 in most cases affirm that nothing further can be said regarding the majority of these minerals than has already been published. It is not, therefore, deemed expedient to attempt to express the information called for under the prescribed Statement II in the form of Statistical Tables.

V.—GOLD (*Soná, Hind.*).

94. ***OCCURRENCE.***—Gold may be said to be found in the following localities :—

(1) MADRAS.—Madura, Coimbatore, Salem, Wynaad, Nilgiris, Travancore, Malabar, South Kanara, North Arcot, and Bellary.

(2) MYSORE.—Kolar district.

(3) HYDERABAD.—Khammamett district.

(4) BENGAL.—Orissa, Midnapur, Bankura, and Champarun districts; Chutia Nagpur, (Lohardaga), (Udaipur), Manbhum, Singbhum, and Darjeeling.

(5) CENTRAL PROVINCES.—Chhattisgarh, Nagpur, Jabalpur divisions, and Upper Godavari

(6) CENTRAL INDIA.—Ajmere-Merwara district. [district.

(7) BOMBAY.—Dharwar, Belgaum, and Kaladgi districts and in Kathiawar.

(8) PANJAB.—Bannu, Peshawar, Hazara, Rawalpindi, Jhelum, Kangra, Amballa, Gurgaon, and Hoshiarpur districts.

(9) NORTH-WEST PROVINCES.—Bijnor, Naini Tal, and Garhwal districts.

(10) ASSAM—.River-sands, especially of Lakhimpur district.

(11) BURMA.—Throughout the greater part of Lower Burma, especially in the river-sands of Tenasserim, and in Upper Burma in several districts, particularly in Katha. It also occurs in Ruby Mines district (in Momeik) and is obtained chiefly in the shape of dust in the dry nullahs in the Engdaing jungles. In Yeu it is found in small quantities by washing in the Shwegyin and Tazè townships, also in Indaing township.

AURIFEROUS SAND-WASHING.

AURIFEROUS SAND-WASHING.

95. A definite statement of the annual production of gold for the whole of India cannot be furnished. Washing of auriferous beds takes place here and there all over the country. It is purely a native industry and it is therefore impossible to obtain statistics that could be advanced with any degree of assurance. The industry of gold-washing is, moreover, for the most part spasmodic, a sort of by-product with certain communities. The particulars furnished, for the year 1895, regarding gold-washing, may be said to perfect in some instances former returns, but more with the view of arriving at a figure of average annual outturn than of giving actual production.

In a criticism of last year's Review of Mineral Production it was stated that "The total earnings of a single gold-washer, in many districts, amount to from two to four ounces, or from ₹150 to ₹300 annually; and, while there are localities where there may be only one or two hundred washers, there are parts of the country, rather remote from public gaze, where there are almost as many thousands." "If we put the total number of washers down at only ten thousand, we should arrive at a production of from 20,000 ounces to 40,000 ounces per annum. This will not be found an exaggerated estimate to those who know the extent to which native gold enters into native jewellery." But in writing a review of statistics, it is not customary to speculate nor even to frame estimates, however desirable these may be under other circumstances. Since the above calculation would, however, give an idea of a far greater annual production of gold from the washings of river-sands than we possess any data for, it may be desirable to place side by side an abstract of the published opinions of numerous writers with regard to the earnings of the gold-sand-washers. It may be premised that the value or otherwise of the above estimate of production turns primarily on the earnings said to be obtained. A production of 2 to 4 ounces valued up ₹150 to ₹300 per annum, *to each person employed*, would of course be a monthly rate of ₹12-8 to ₹25. If so, gold-washing must be much more profitable than agricultural or handicraft earnings, and it is difficult in that case to understand why it should have continued for so many centuries to have successfuly courted seclusion from the public gaze. We should, moreover, expect to find indications of wealth among those who follow this trade, whereas they are generally spoken of as the poorest members of the village communities.

In Burma the earnings during the working season have been put at 3 annas a day. Mysore sand-washings are said to have yielded 4 annas. In Chutia Nagpur (Udaipur State) the earnings have been put at 3 to 4 annas. In the Central Provinces (Jabalpur) at 4 annas, where also it is held that the goddess who makes the gold would leave the locality should at any time the earnings exceed that amount. In the Panjab (Peshawar) the daily rate is put at 2 annas or (Rawal Pindi) at 3 to 4 annas. But it should be recollected that in no locality in India can river-sand-washing be carried on throughout the year. Assuming however, that 4 annas a day is obtained for every day of the year, or ₹8 a month, each worker at the rate

Earnings.

GOLD :

AURIFEROUS SAND-WASHING.

per ounce of gold given in the estimate, would secure a little over one ounce and the 10,000 workers assumed above would thus at most produce 10,000 ounces instead of 40,000.

96. The returns furnished of production from auriferous sands do not, however, exceed 2,000 ounces for any year on record, and it is thus perhaps safe to assume, that a yield of 10,000 ounces would be the very highest admissible as the production of gold from river-washings. Indeed the census and other sources of information would place the number of persons employed, even for a portion of the year, at a very much lower figure than that given in the above estimate. Speaking of the Census of 1891 there is a somewhat curious circumstance mentioned, namely, there were found to be 23,676 persons who made a living by washing the refuse of the goldsmith's shops and recovering from it the minute particles of the precious metal that had been clipped or piled off in the ordinary course of work.

Estimated Production.

But even were we to accept an estimate of 40,000 ounces of gold as annually produced by the washing of the sands of certain rivers, that amount would have to be regarded as insignificant when compared with the success that has attended gold mining in Mysore. In fact the chief interest in the gold-washings might be said to lie in the feasibility of their giving indications of the possibility of the extension of mining operations.

TOTAL OUTTURN.

97. *OUTTURN.*—Before proceeding to review the available information on the subject of the Indian gold mines it may be as well to record in this place the returns of gold production for the year under review :—

GOLD PRODUCTION OF INDIA IN 1895.

Locality.	1894.		1895.	
	Oz.	₹	Oz.	₹
Madras . . .	961*	50,565	1,383	91,328
Mysore . . .	210,082	1,42,53,856	246,758	1,74,30,370
North-West Provinces	57	3,702	54	3,473
Panjab . . .	447*	22,612	447*	22,612
Kashmir . . .	35	1,503	37	1,342§
Hyderabad . .	99	2,970†	99	2,970†
Burma . . .	89‡	5,000	107‡	6,000
Bengal . . .	...	...	...	...
TOTAL .	211,770	1,43,40,208	248,885	1,75,58,035

* Originally returned as the production of 1891, and not subsequently modified; may be accepted as the mean annual production.

† The same quantity and value are given in 1895 as in 1894. It is explained that the quantities cannot be given as the working of the mines is given out on contract.

‡ Value only furnished : the quantity has been estimated on the ratio of previous quotations.

§ Value of 28 ounces.

The total production thus expanded by 17·52 per cent. on the quantity and 22·44 per cent. on the value as compared with last year's returns. And if the comparison be carried back to 1892, it is found that last year's production manifested an expansion of 51·22 per cent.

FOREIGN TRADE.

98. *FOREIGN TRADE.*—Before proceeding to discuss these very striking figures of production of gold it may perhaps be as well to furnish a statement of the Imports and Exports in the precious metal :—

The following table shows the Imports and Exports between India and foreign countries during the past five years, as also by way of comparison the figures for 1852 and 1872 :—

Table showing Total Imports and Exports of Gold.

YEAR.	IMPORTS.		EXPORTS.	
	Ounces.	Value in Rupees.	Ounces.	Value in Rupees.
1890-91 . .	1,175,875	65,008,317	161,646	8,646,600
1891-92 . .	709,102	41,189,291	285,454	17,051,369
1892-93 . .	272,442	17,817,891	726,925	45,944,720
1893-94 . .	474,635	31,465,300	378,399	25,052,840
1894-95 . .	236,873	17,562,800	926,843	67,303,740
Average of past five years .	573,785	34,608,720	495,853	32,799,854
1852-53 . .	...	£1,341,106	...	£168,805
1872-73 . .	...	£2,622,371	...	£79,000

GOLD: FOREIGN TRADE: Exports.

The proportion of these marvellously increased exports of gold that can be attributed to the rapidly increasing production cannot of course be determined. With the fall in the value of silver the hoards of gold in India seem to have been drawn upon and the gold poured out of the country. And it cannot be said this drain gives any indication of abatement. Last year the exports were 926,843 ounces valued at R67,303,740 or an increase of 144·94 per cent. on the quantity and of 168·64 per cent. on the declared value of the previous year's exports. It will be seen from the above table that the net balance of exports and imports came last year to an export of 689,970 ounces or 441,184 ounces over and above local production.

GOLD-MINING IN INDIA.

GOLD MINING.

99. ***MYSORE GOLD MINES.***—Though very much more is heard of coal and coal-mining in India than of gold, the latter is of greater intrinsic value than the former. The declared value of the gold produced last year from the mines of Mysore and the adjacent British district of Madras came to R1,75,21,698 or estimated at the rate of exchange of 1 shilling and 2 pence, it came to £1,022,000. As compared with that figure coal mining (last year's value £847,048) has very distinctly to take a second position. The potential value of coal is not, however, to be compared with that of gold. It gives vitality to the entire industries of the country, and thus secures a nation's well-being in place of the prosperity of a few owners and a limited number of employés. It has been thought desirable, however, to emphasise the importance and value of the Indian gold mines, since it is customary to find them relegated to a position of insignifiance among the minor and undefined industries of the country. Through the pluck and perseverance of a few Englishmen, gold-mining has within the past decade been raised to a position of great importance. On this subject Mr. James Grundy (*Report of the Inspection of Mines in India during 1895*) while speaking of the Mysore mines says: "Gold-mining is being carried out on an extensive scale, and being done energetically. It finds employment for large numbers of men from many parts of India. A great quantity of material is used, both Indian and foreign, such as coal, timber, explosives, iron, steel, steel-wire ropes engines, boilers, other machinery, chemicals, oil, candles, antiseptics, paints, paper, food, clothing and drinks. The benefits arising from the use of all these materials, and many more, not named, reach far and wide; but they are most apparent in the adjoining and neighbouring villages and in the towns within easy reach of the mines."

Mysore.

"Such an industry, that converts a rocky jungle into a hive filled with prosperous people, and whose prosperity radiates for miles around, and even reaches beyond the seas, deserves, and can reasonably claim, every encouragement in return." "The success of these mines appears to be almost solely due to the most dogged perseverance of Englishmen. The pioneers of these mines worked on and on, and spent their fortunes in proving the mines; they certainly worked and spent money in what was to them the sure and certain hope that the mines would provide their own reward." "The same thing is going on to-day, in the same mining district; with the exception that they have all the previous and present work and known conditions and experience to guide them." "It is no secret that 10 out of the 14 mines visited are working at a regular heavy loss, and have been doing so for many years; and other companies have done the same as long as they could, and then had to retire with empty purses and blighted hopes. It is clear, therefore, that all the prosperity referred to comes from the few successful mines, and the greater number of mining companies who are finding work for the people, and spending money in the hope that they will some day be rewarded."

Description of mines.

100. ***POSITION AND CHARACTER OF THE MINES.***—"The present working (Mr. Grundy tells us) covers a tract of country almost exactly nine miles long. There are upwards of 62 shafts in use, and a large number out of use. The depths of the shafts in use vary from about 30 feet to nearly 1,500 feet; several of them are considerably over 1,000 feet deep, and quite a large number over 500 feet." "The lodes run in a nearly north and south direction, consequently the whole of the mines are in a nearly north and south line. The most southerly mine is Mysore Reef; and this mine occupies the unique position of being the only mine included in the 'Kolar Gold Field' that is outside of the Mysore State."

"The most northerly workings are two prospecting mines belonging to the Gold Fields of Mysore Mining Company, and almost exactly nine miles in a straight line from the Mysore Reef Mine." The breadth of the field is comparatively small.

"Ladders as a means of ingress and egress is the universal rule; so that to get into, and out of, and about the mines during the 29 underground inspections, I travelled along 27,314 feet, or nearly 5¼ miles of ladders in shafts, winzes, etc."

"There are about eleven distinct Mining Companies, nine Superintendents in charge, nineteen Mine Captains and underground foremen. The underground employés number 7,000; and 5,360 are ordinarily employed aboveground in addition to a large number of extraordinary employés." Mr. Grundy points out that the number of employés is about ⅓rd of the total number employed underground at all the 825 metalliferous mines of the United Kingdom. And he adds "much of this is due to the fact that the work done per man in India, is very little. But the accumulated work done at these mines, on any one day, is very great, for the mines are extensive, and are worked energetically."

Names of mines.

101. ***ENUMERATION OF THE MYSORE MINES.***—There are 14 mines in the Kolar district and 2 in the Hassan district. Of the former, 3 have been suspended or are only kept free from

GOLD:
GOLD MINING.

water, and of the later one has not yet commenced to work. The relative importance of the other mines may be roughly indicated by the number of persons employed :—

Number of persons employed.

1. The Mysore Gold Mining Company, Limited	2,650
2. The Oorgaum Gold Mining Company, Limited	2,502
3. The Champion Reef Gold Mining Company, Limited	2,346
4. The Nundydroog Gold Mining Company, Limited	1,778
5. The Balaghat Mysore Gold Mining Company, Limited	1,079
6. The Kempinkote Gold Mining Company	415
7. The Yerrakonda Gold Mining Company, Limited	340
8. The Coromandel Gold Mining Company, Limited	320
9. The Mysore West, and the Mysore Wynaad Consolidated Gold Mining Company, Limited	300
10. The Nine Reefs Gold Mining Company, Limited	289
11. The Gold Field of Mysore Company, Limited	20
TOTAL EMPLOYÉS	12,227

Of that number 7,117 work below ground.

Special Reports for 1895.

102. The following jottings may be given from the returns of mineral production during the year 1895, as showing the position of the industry of gold-washing or gold-mining in the provinces concerned :—

BENGAL.—There was one prospecting company working in the Manbhum district, but it was closed in January 1895. There are no mining companies at work in the Province.

MADRAS.—The quantity of gold produced in this Presidency amounted to 1,383 ozs., valued at ₹91,328.

MYSORE.—The information furnished by this state have been incorporated in the foregoing remarks.

BURMA.—At Kyaukpazat Mr. Wright has erected a crushing-mill, has exposed 240 feet of reef and several shafts aggregating 241 feet in depth. Up to November 1895, the sale of gold totalled ₹6,000.

NORTH-WEST PROVINCES AND OUDH.—The only districts in which gold is found in any quantity in these provinces are Bijnor, Naini Tal and Garhwal. The estimated production in 1895 has been reported at 54 ozs. valued at ₹3,473. The general method of working this mineral is the washing of auriferous sands found in the beds of certain rivers, most notably Ramganga, Sukhar Sot, Phika and Khoh in the Nagina tahsil of Bijnor district.

KASHMIR.—Gold weighing 74 tolas 8 mashas and 5 rattis from Skardu tahsil obtained by manual labor from sand at the bank of the Attock river and purchased at the rate of ₹18 per tola, value ₹1,341-15. Gold weighing 22 tolas 6 mashas 5 rattis annually recovered in revenue from Shagar Ilaka.

Grants and Licenses.

103. ***MINING GRANTS AND LICENSES.***—During the years 1889 to 1895, 35 grants and licenses for gold were issued, of which 14 were made in 1895. These do not, however, include the licenses and grants issued by the Mysore Government.

PRECIOUS STONES.

AMBER.

VI.—AMBER (*Kah rubá, Hind.*).

104. ***OCCURRENCE.***—The only locality in India where Amber (a fossilised resin) is known to occur with any certainty is in the Hukong valley of the Bhamo district of Upper Burma. Since the annexation of that province the right to collect the duty on the mineral (5 per cent. *ad valorem*) has been sold by auction, together with that of Jade licenses.

105. ***OUTTURN.***—Returns for 1895 have not been furnished. The outturn in 1894 was given as 87lb, valued at ₹160. That for 1893 was stated to have been 549 cwt., valued at ₹2,900. In explanation of the variation in the price, the Deputy Commissioner remarked that in 1894 Amber was reported as obtained in one month only, whereas in 1893 the price varied from month to month, ranging from ₹2 to ₹20 per *viss*. He also affirmed moreover, that the outturn for 1893 was doubtless incorrect, and that in this matter accuracy could not be expected in the returns. The price at the mines usually averages from ₹6 to ₹15 a *viss* (= 3·65lb), and in Mandalay from ₹15 to ₹40. The yellow form is more rare than the red.

The Amber mines are worked by Kachins in a fitful and haphazard manner. In excavating, a shaft is sunk for 70 to 80 feet. Should the miners be fortunate enough to strike a vein, a side passage is made following the vein. At certain points lumps may be found which sometimes weigh as much as 1,000lb. These blocks of Amber are carefully removed, then sawn into the required shape and size.

106. ***MEDICINAL FORM.***—A variety of Amber called *Payinswe* used to be sold by the miners to the Chinese and taken to China, where it is used as a medicine.

VII.—BERYL—EMERALD (*Sabzá, Panooa, Fastiki Kerasi, Hind.*). BERYL.

107. ***OCCURRENCE.***—This mineral is not alluded to in any of the reports obtained for the years 1894 and 1895. There is a famous old mine in the Coimbatore district of Madras Presidency, but it is not now worked. The mineral is also found in several localities of the Panjab Himalaya; in Hazaribagh and Rajmahal in Bengal; near the Talchir coal-field of Orissa; and its occurrence in isolated positions throughout Rajputana has been repeatedly published, but as yet no industry has been organised for its utilisation.

VIII.—DIAMOND (*Hirá, Hind.*). DIAMOND.

108. ***OCCURRENCE.***—Diamonds are said to have been found over six areas, *viz.*:—

(1) The Kistna valley side of the Deccan.
(2) The Madras Presidency, in the districts of Anantpur, Cuddapah, Kurnool, and Godavari (Ellore).
(3) Chutia Nagpur in Bengal.
(4) The Central Provinces.
(5) Bundelkhand.
(6) Hyderabad.

109. ***PARTICULARS OF MINING AND WASHING.***—While the gems actually do occur in the regions named, or have been reported as found, the industry of mining or washing for diamonds can hardly be said to be a flourishing one anywhere in India. The least important localities are Chutia Nagpur and the Central Provinces. Indeed, the reputation of diamonds in Chutia Nagpur may be regarded as highly doubtful. Diamonds were, however, formerly found in the neighbourhood of Hirakhoond in the Sambalpur district of the Central Provinces, where, in the days of Native rulers, operations were regularly prosecuted by damming and washing to search for the gems. The work was in the hands of professional diamond-washers known as *Jhirias*, who were liberally rewarded by grants of land for valuable finds.

A lease was granted by the Government to a syndicate of capitalists to search for diamonds in and near the Mahanadi above the town of Sambalpur, but its operations proved a failure. It is thought that diamonds may also be found in some of the crystal pits near Gorpur, Kobra, Dhundee Towa in the Betul district, and near Pattan in the Maltai tehsil of the same district, but no precise information is available.

The Hyderabad (Deccan) Company have carried on exploratory workings at certain localities in the Hyderabad State with partial success. From their workings over 3,000 diamonds have been obtained, but the stones being minute, the proceeds obtained bore an unsatisfactory relation to the outlay incurred. The Company claim to have found old workings at certain places in the Ghanpura Circar, but the nature and capacity of these deposits remain to be exploited. The most recent returns of the Deccan Diamond workings are those of 1891, when the outturn for the Hyderabad State was put at 862¾ carats, valued at ₹15,530. From the Kistna valley side of the Deccan, the outturn for the two years 1888 and 1889 is recorded as 93 carats, valued at ₹108. Later operations have, however, increased this considerably. No statistics are obtainable from the other districts of the Madras Presidency. It is said that the supply from the Ramalcotta washings has been unremunerative. Diamonds are met with near Banganapalle on 400 acres of land bordering the river, but there has been no industry for some years past.

110. ***OUTPUT.***—The value of the diamonds extracted from the mines in Bundelkhand during the year 1893 was put at ₹20,549, and the report of the workings of 1894 showed a production of 210¾ carats, valued at ₹16,251-8-2. The corresponding figures for 1895 are 215 carats, valued at ₹19,506. These diamonds are mostly obtained on the Panna plateau which is shared by several Native States. Occasionally a few stones are carried by the rains down to the plains and are there to be found by superficial washings. Production in Bundelkhand fluctuates very greatly. There are no State works and no capital expended, consequently a shaft once sunk has to be abandoned after the rains, from want of machinery to keep it open. The method of procedure is accordingly chiefly by superficial mines which are worked during the rains, since no water is available during the hot season.

IX.—GARNET (*Yáqút Chunri, Mehtab Hind*.). GARNET.

111. ***OCCURRENCE.***—The Garnet is common in various localities in India, those of Rajputana being the most important. The stones found in South Canara and Salem districts of the Madras Presidency have been pronounced as practically of no value, and those of Monghyr district in Bengal are so much fractured, that they do not appear to be marketable.

Garnets are fairly abundant in Burma, as, for example, throughout the Mogók township, in the eastern and hilly portion of Twinnge township of the Ruby Mines district, and also in parts of Momeik States.

112. ***TRADE IN GARNETS.***—The Garnets of Rajputana are, however, of considerable value. The stone is met with in the Bhilwara district of Meyar. The revenue derived in 1894 from this source was ₹3,549 and in 1895 ₹1,775-15. The mines at Sarwar in the Kishengarh State, Rajputana, are being constantly worked, and yield an average annual revenue of ₹2,500. These mines are generally worked

GARNET. by the local Jogis and Malies, who are great experts at prospecting for Garnet mines. The Sarwar garnets are considered the best in Rajputana, and are greatly prized, on account of their deep pink brilliant colour, for making jewellery, of which there is a flourishing industry at Sarwar. There are some fifteen manufactories of carbuncle jewellery worked by the local Muhammadans, who sell to the Mahajan traders, from whom the European firms and exporters receive their supplies.

JADE.

X.—JADE and ADEITE (*Yashmi, Hind.*).

113. ***OCCURRENCE.***—A stone known in commerce as Jade is extensively worked in the Mogoung sub-division of the Bhamo district and in the Upper Chindwin and Katha districts of Upper Burma. Its colour varies from pearly grey to dark green. It is in very general demand throughout China. A variety highly prized by the Chinese is pale grey, with bright apple-green spots, clouds, and veins. A block of less than a cubic yard in size was some years ago valued in Rangoon at £10,000, and the Chinese are said to have offered £8,000 for it.

The Bhamo Jade-producing country is by far the most important. It may be described as a region lying between the 25th and 26th parallels of latitude, and shut in by the Chindwin and Mu rivers on the west and east, respectively. The mines now being worked are known as Tawmaw, Paungmo, Iku, Matiemmo, and Nienmo. The Tawmaw quarries have been worked for several years, but the stone is by no means exhausted. The Jade quarries of Katha district are situated about 12 miles north of the Mawhun hill, some 60 miles from the head-quarters of the district. The Jade extracted from these quarries is inferior to that produced in Bhamo, where the present mines yield a better class of stone than in 1892.

114. ***PRODUCTION.***—The outturn at Bhamo in 1894 was estimated at 727 cwt., valued at R1,15,091. The outturn in 1895 has been given as 37,513 pieces valued at R1,30,543. The industry is said to be flourishing. A royalty of $\cdot 33\frac{1}{3}$ per cent. is levied on all Jade-stone extracted in Upper Burma. The right to collect this duty, together with the duty on Amber, is sold annually by auction. The licensee for the year 1892, a Chinaman, purchased the privilege for R36,000.

A fine green stone, probably Jadeite or Jasper, is found at Mohgaon in the Sanson tahsil of the Chindwara district of the Central Provinces, and appears to have been worked at some remote period.

115. ***TOTAL INDIAN TRADE.***—The quantity of Jade-stone exported by sea during the year 1893-94 amounted to 2,270 cwt., valued at R4,34,650, the trade thus showed a decline of nearly one thousand cwt. on that of the year preceding. But in 1895 the exports were 2,540 cwt., valued at R4,53,062 consigned from Burma to the Straits Settlements.

116. ***False Jade.***—A considerable amount of stone known as False Jade (a form of serpentine) is annually imported into the Panjab from Afghanistan. It is said to be found near Kandahar and to be brought down the Indus to Attock on rafts floated with inflated skins. It is conveyed to Bhera in the Shahpur district, where it is manufactured into knife-handles. This stone is known as *Sang-i-Yesham*. It is cut by iron saws and water mixed with red sand and pounded emery (corundum, *kurund*).

QUARTZ.

XI.—QUARTZ (*Chakmak, Hind.*).

117. ***OCCURRENCE.***—This mineral, which includes rock-crystal, amethyst, cornelian, agate, jasper, onyx, etc., occurs in the Monghyr district of Bengal, and is extremely common in the Hyderabad State.

On the subject of quartz in the Monghyr district, Messrs. Steven Ambler & Co., of Jamalpur, write as follows:—

"Quartz occurs running in regular veins parallel to the lines of bedding, and throughout the conditions are such as occur in gold-bearing quartz, and such as would warrant an exploration to search for that metal."

This mineral is also found in the Salem district of Madras as veins of very pure quality, unstained by iron. The Elephant Rock in the lower slopes of Shevaroys is also a magnificent mass of pure white quartz. The stones found in Coorg are mainly used for metalling roads. Gold-bearing quartz occurs in the Katha district of Upper Burma.

Onyx (*Sang-i-Sulemāni*, Hind.) are found plentifully in the crystal pits in the Betul district, and there is a band of coarse Onyx near Amerwara in the Chhindwara district.

Agate (*Yamni Akik*, Hind.), cornelian, etc., are found in the beds of the Narbada, Bhima, Godavari and Kistna rivers.

Rock-crystal (*Billaur*, Hind.) occur in the Patna Feudatory State in the Sambalpur district; there are some good specimens in the Nagpur Museum.

118. ***INDUSTRIAL USES.***—A small industry in rock-crystal of different colours called "Vallam stone" is carried on at Trichinopoly and in the Palladam taluq of the Coimbatore district of the Madras Presidency, the stones being brought from Vallam in Tanjore. Spectacles and dolls are made out of them. The "Godavari pebbles," which were formerly eagerly sought after, are not now in demand, being most probably out of fashion.

The most important industry in quartz, or rather ***Cornelian*** (*Sang-i-ákik*, Hind.), etc., is that which for centuries has existed in the Bombay, Presidency, more especially at Cambay; the stones are brought from Rajkot and Rajpipla into Bombay, and a considerable trade is done in them. Mr. Grundy mentions there being four *Akik* quarries at Rajpipla. Broach is also another centre for this industry. Less important centres of lapidary work are those of Jabalpur and Banda.

XII.—RUBY (*Lal, Manik, Hind.*); SAPPHIRE (*Nilam, Hind.*); SPINEL and TOURMALINE. RUBY.

119. ***OCCURRENCE.—Ruby.***—The chief Ruby Mines of Upper Burma are situated in the neighbourhood of Mogok and Kyatpyin, in the Ruby Mines district, and are worked by the Burma Ruby Mines Company, Limited, and by native workers. There are four regular mines that give employment to 1,048 persons. The Ruby Mines Company, Limited, have a capital of £300,000, and their outturn last year was put at 56,108 carats, valued at ₹2,91,357. The provincial report from Burma for the year 1895 states that "It is known that many rubies have been found at Nanyaseik, but the people who find rubies are not anxious to tell their neighbours or the public. It is said that two rubies worth ₹5,000 each and one stone worth ₹10,000 were found, besides a large number of small stones."

Spinels and ***Sapphires*** are not intentionally worked for, but are often obtained in association with the Rubies. In the Ruby Mines district, Rubies, Spinels, Catseyes, Sapphires, and inferior precious stones are found throughout the Mogaung township, near the villages of Wapyudaung, Kyaukgyi, and Yingan in the eastern and hilly portion of the Twinnge township, also near Sagadaung and Udintaung in the Momeik State. The principal ruby-bearing region, *i.e.*, that of Mogôk and Kyatpyin, extends over an area of 66 square miles, but the tract in which the Ruby mines are now actually worked is about 45 square miles in extent. The mines are situated in a mountainous tract some 90 miles north-west of Mandalay and 50 miles by road east of Thabeikkyin on the Irrawaddy, at an elevation of 5,000 feet above the sea. The stones occur in small patches in the valleys or between the fissures of the rock, or on the surface soil of the hillsides.

Another ruby tract is that known as the Sagyin Ruby Mines, Mandalay. These are situated in a narrow range of hills rising from the plain of the Irrawaddy valley, 24 miles north of Mandalay, and 8 miles from Madaya. These mines are at present reserved by Government and are not being worked. So again Rubies are found in Bhamo in the Nanyaseik stone tract; but the extent of occurrence is not known. The production in 1894 is said to have been 26 tolas, valued at ₹6,750.

In India itself certain tracts of country are said to contain rubies, such as in the Salem district. The Collector of that district says, however, that garnets are often mistaken for rubies, and that, if there be rubies at all, they are not true rubies, but spinels.

120. ***MINING AND WASHING.***—In the Ruby Mines district the stones are obtained by sinking pits through the superficial soil, until the stone-bearing stratum (*byón*) is reached. This occurs at depths varying from 3 to 20 feet. The earth obtained from these pits is washed through sieves and the stones separated.

The earth from between fissures of rock is similarly treated, except that of course, pits are not required. The earth is simply dug out of the crevices and washed. The hillside deposits are worked by washing away the surface soil by means of streams of water diverted for that purpose. The stones are then obtained from the surrounding soil by the usual method of washing. Another process of securing rubies and the one which is now principally employed by the Ruby Mines Company, is that of tunnelling into hills, in order to reach the fissures containing *byón*. The *byón* is dug out, conveyed to a washing station and the rubies separated.

121. It may easily, however, be understood that it must be more difficult to secure remunerative supplies of the stones now-a-days than in former years, since the more accessible deposits have been exhausted. The revenue of the Ruby Mines under the Burmese Kings is said to have been about £12,000 to £15,000 a year.

122. ***Kashmir Sapphires.***—Recent returns are not forthcoming regarding the traffic in Sapphires. It is stated that in 1889 these stones, to the value of ₹15,000, were derived from Kashmir. In a criticism on this remark, discrediting last year's Review, it was stated that "only the other day Cashmere State disposed of several lakhs of rupees worth" of sapphires. This year's report from Kashmir on that subject is as follows:—"A sapphire mine exists in the Padar Jaskar tahsil which once produced valuable sapphire stones, but its working has long since been abandoned owing to its yielding stones of extremely inferior quality which can scarcely be called sapphires." Mr. W. R. Lawrence (*The Valley of Kāshmir, 1895*) speaks of the sapphire mines as having been accidentally discovered in 1882 but as being long since abandoned. Men who were in charge of the sapphire mines in Padar, he tells us, have spoken to me of other valuable minerals. Mr. La Touche while dealing with the economic geology of Kashmir remarks: "Even the common minerals, coal and iron, are not found in any large quantity, and where they do occur are poor in quality. Accident may bring to light the presence of some of the rarer minerals, as in the case of the sapphires, but even the most energetic and intelligent prospector might spend years among the mountains before making such another discovery." Mr. Mallet tells us that "the rock in which the sapphires were discovered, which was doubtless a crystalline one, as the whole of the Zanskar range is composed of such, appears to have been decomposed and crumbly at the surface, so that the gems could be taken out like potatoes. Further in, the rock was more solid and they could only be extracted with the aid of tools. A very large quantity appears to have been obtained, and the first lots that were brought across the snow are said to have been sold for a mere trifle, owing to the ignorance of the carriers as to their value. Subsequently, however, when the fact that the stones were real sapphires was known, they rose in price to ₹100 per tola in the rough, and considerably more for really promising pieces."

123. ***Tourmaline***—Is generally Rubellite, good specimens being of a deep crimson but "flesh-red," examples have been found in Pegu. Occasionally also white specimens have been found among the

RUBY. black stones that come from the Shan States. The report furnished by the Government of Burma on the subject of Tourmaline for the year 1895 was as follows:—Is found in Maingmaw, Môngmit State, and on the Mobyèchaung between Mogôk and Mainglôn. The present state of the industry is bad, due to a fall in market consequent on the late China-Japan war, the Chinese being the only buyers.

Green tourmaline has also been mentioned as occurring in the Hazaribagh district of Bengal and in the granite dykes traversing gneiss, in the bed of the Cauvery at Seringapatam. Yellow, brown and green tourmaline have been recorded in association with the sapphires of Kashmir and often also present in the rubellite beds of other localities.

124. ***Oriental Emeralds*** have also been found in the Ruby Mines.

Besides the gem forms of this mineral, India is particularly rich in Corundum, which see page 44.

MISCELLANEOUS MINERALS.

ALUM.

XIII.—ALUM (*Phitkari, Hind.*).

125. ***OCCURRENCE.***—Alum shales occur in several parts of India, but are more particularly worked at Madh in Cutch, at Kalabag and Kutki in the Panjab, and in Behar. In the Shikarpur district, alum is said to be manufactured on the Kirthar range in large quantities and of fair quality. In 1867 the yearly outturn of Cutch alum was estimated at 294 tons, but after that time it fell off. About 44 tons of alum are made annually at Kalabag, and 367 tons at Kutki.

Alum is also found in the Ye-u district of Upper Burma, near Udaung in the Indaing township, but it is not worked.

126. ***TRADE.***—Alum is extensively employed throughout India as a mordant in dyeing, but particulars of the extent of the traffic are not procurable.

ANTIMONY.

XIV.—ANTIMONY (*Surma, Hind.*).

127. ***OCCURRENCE.***—Good lodes of Stibnite occur at Shigri in Lahoul and also in the Jhelum district of the Panjab The Jhelum mines are annually leased by the District Forest Officer. There is also said to be one mine in pargana Bardi of Rewah in Central India. Antimony is met with in the Ye-u district of Upper Burma near Udaung in the Indaing township, but it is not worked. But perhaps the most hopeful deposits of antimony are those found in the Kyaukkaung tract of Tenasserim. On May 8th, 1894, Mr. J. H. Herrifield submitted a report on these Tenasserim deposits. "The Kyaukkaung, he says, is divided into two unequal portions of approximately 250 and 370 square miles, respectively. Of these, the smaller western portion belongs to us; the larger eastern to the Siamese." "Mr. Adam, who in Antimony is an acknowledged expert, states that he considers the deposit withi British territory as of immense value. He was originally brought out from Scotland by the Borneo Company to work their Antimony deposits in North Borneo." "I understand from him that the Stibnite (the commercial ore of antimony) here, as in Borneo, occurs in irregular deposits of a 'pocketty' nature, often massive and of great value, lining and filling fissures in the limestone in immediate junction with the newer states that overlie the limestone. The method of working is fossicking and poking about in likely localities till a run of payable ore is found, and blasting out the pockets usually in open-casts. Rarely, and then only in the very richest ground, is sinking or driving on any scale attempted." "It is considered cheaper to smelt on the spot and to ship the crude regulus (unrefined pig), the necessary plant can be erected at small cost."

128. ***ECONOMIC USES.***—"The principal commercial use of Antimony is in the manufacture of type-metal, for which the demand is enormous and steady; the market is consequently fairly regular and is not subject to the violent fluctuations that have so baneful an effect on tin and other fluctuating staples. Antimony also enters into the manufacture of gong-metal, speculum metal, certain classes of gun-metal, bell-metal, and bronze-alloys."

ASBESTOS.

XV.—ASBESTOS "*Shankha palita, Mar.* (= wick made of shells)".

129. ***OCCURRENCE.***—There is no recognised industry in collecting and utilising Indian Asbestos. The mineral is reported to occur in Afghanistan, the Panjab, Garhwal, Bhopawar (in Central India), in Chutia Nagpur and in Mysore. In 1894, 5 maunds, valued at ₹40, and in 1895, 6 cwt., valued at ₹48, were procured from Hassan in Mysore.

BORAX.

XVI.—BORAX (*Suhágá, Hind.*).

130. ***OCCURRENCE.***—This mineral occurs on the margins of certain lakes in Tibet itself or just within the Panjab frontier of Tibet and in Jummu. In 1855 an attempt was made to develop the trade in native borax. At that time England's imports were 1,100 tons, of which, owing to a monopoly that existed in the trade, only 300 to 600 tons were produced in India. An inquiry was then set on foot which

although resulting in many interesting facts on the subject being made known, was not successful in materially improving the trade.

(*1st*) ***Pugá Borax.***—The Pugá borax is obtained from the small valley of that name. The valley was visited by Captain W. C. Hay, who estimated the entire produce at 20,000 *kutcha* maunds (1 *kutcha* maund = 32lb). Most of it goes *viâ* Rámpúr to the lower hills about Subáthu, Bhaji, etc., where in winter it is refined by the carriers, and thus becomes the borax of commerce. At Jagadri in the plains there are extensive refineries that receive nearly all the Pugá borax. The article is then carried down the rivers Jumna and Ganges, but it is doubtful if it reaches England in any quantity. Borax of a superior quality, in fact nearly pure, is found near Rudokh,—a portion of Tibet subject to China. It is also believed that if the jealousy of the sellers could be broken down, other borax-yielding districts would be discovered.

(*2nd*) ***The region of Indian Borax*** may be said to commence in the west, at the valley of Pugá in Ladak, passing east to the lakes of Rudokh. Along this tract of country and extending considerably to the east, a chain of salt lakes occurs, most of which in all probability afford borax. In a report to hand it is stated that during 1895 Kashmir State produced 1,335 maunds, valued at R3,755 or R2-13-3 per maund.

To the south of Lhasa, at the Yamdok Cho, borax is known to have been collected from time immemorial. In Tartary holes are dug in the arid soil of many parts of the deserts; within these native borax collects and is periodically gathered.

The process of purification has been described thus :—

PURIFICATION OF BORAX.—"The borax is pounded and placed in shallow tubes, and then covered with water to the extent of a few inches; to this is added a solution of about two pounds of lime (dissolved in two parts of water) for every ten maunds (820 pounds) of borax, and the whole mass is well stirred every six hours. Next day it is drained on sieves or cloth, and after this is again dissolved in $2\frac{1}{2}$ times its weight of boiling water, and about sixteen pounds of lime added for the above quantity. It is then filtered, evaporation takes place, and subsequently it is crystallized in funnel-shaped vessels, usually of *kansa*, an alloy of copper and zinc or lead. The loss in weight is about 20 per cent."

131. ***TRADE IN BORAX.***—Borax is chiefly imported into India through the North-West and the Panjab Himálaya. The following statement shows the principal ***Imports*** for the years 1883-84, 1893-94 and 1894-95:—

Imports from Tibet into the North-West Provinces.

YEARS.	Weight in cwt.	₹
1883-84	24,873	337,938
1893-94	14,850	157,548
1894-95	13,710	172,167

Imports from Ladak and Tibet into the Panjab.

YEARS.		Weight in cwt.	₹
1883-84	Ladak	6,676	73,081
	Tibet	2,452	20,028
	TOTAL	9,129	93,109
1893-94	Ladak	1,148	10,588
	Tibet	968	7,908
	TOTAL	2,116	18,496
1894-95	Ladak	1,327	14,197
	Tibet	978	10,648
	TOTAL	2,305	24,845

BORAX.

Exports.—In India the trade in borax, judging by the returns available, may be said to be decreasing; the figures returned of the exports of this article to foreign countries also show a marked decline. But the decline may be taken as a natural consequence of the discovery of extensive beds of borax in America, and of the greatly extended trade in the artificially prepared article. It has, however, been inferred that, although India cannot hope to compete in the foreign trade her trans-frontier imports will always be of importance, owing to the considerable internal consumption. The article is inferior to that of Tuscany or California, and the transit charges across the Himálaya to the coast are prohibitive.

Analysis of the Foreign Export Trade in Borax for 1894-95 as compared with that for 1893-94 and 1883-84.

Province from which exported.	1883-84.		1893-94.		1894-95.		Country to which exported.	1883-84.		1893-94.		1894-95.	
	Cwt.	₹	Cwt.	₹	Cwt.	₹		Cwt.	₹	Cwt.	₹	Cwt.	₹
Bengal . .	16,095	3,54,699	7,017	1,20,323	7,716	1,35,098	United Kingdom	1	2,92,585	4,595	74,616	2,645	41,006
Bombay . .	9121	3,819	213	5,148	154	3,580	Arabia . .	38	1,130	26	667	76	1,798
Madras . .	...	...	...	...	10	730	Hong-Kong .	1,713	56,424	2,086	40,171	4,581	85,569
							Straits Settlements .	258	6,147	319	5,375	327	6,017
							Turkey in Asia .	36	1,057	152	3,666	38	832
							Other Countries .	37	1,175	52	973	213	4,246
TOTAL .	16,216	3,58,518	7,230	1,25,471	7,880	1,39,408	TOTAL .	16,216	3,58,518	7,230	1,25,471	7,880	1,39,408

COPPER.

XVII.—COPPER ORES (*Támba, Támá, Hind.*).

132. ***OCCURRENCE.***—These ores are widely distributed. They occur in Singhbhum and Dalbhum, and are said to be found also in the Banka division of the Bhagalpur district, Bengal; but mines in the latter locality do not appear to have ever been opened. Azurite and other carbonates of copper are found at Kakwara in South Bhagalpur.

Copper ores occur in several places in the Chanda district of the Central Provinces, and there are at least three places in the Mul tahsil, where mines were worked in ancient times. These ores are also found near Birman in the Narsinghpur district and Gosalpur and Khetola in the Jabalpur district, but in the latter place it has not been worked as an industry. In Rajputana, copper ores are found in several of the independent States, and in the British district of Ajmír, where mining was practised on a large scale, but is now almost extinct. There is said to be one copper mine in Rewah State, Central India. Unsuccessful attempts have been made to work the copper ores of Kumaon, Garhwal, the Western Duars, and the Darjeeling districts. Copper mines are said to exist in Hyderabad, but valuable ores in any quantity have not as yet been discovered. In Burma copper ores are believed to exist in the hills east of Kyannhyat, Ruby Mines district; last year Messrs. Hegt & Co. were reported to have applied for a license to prospect in that locality, but in the returns of 1895 no further mention is made of this fact.

133. ***OUTTURN.***—Statistics regarding production of copper in 1895 are not available. The outturn in Bengal during the year 1891 was estimated at 2,500 tons, valued at ₹1,32,500. In 1888, 218 tons of refined copper were said to have been turned out.

The industry of copper smelting has been dormant in India for many years, and may be said to have revived to any extent in two localities in Bengal only, *viz.*, Baragunda in Singhbhum and in Dalbhum, where a company is said to be working the ore.

134. ***TRADE.***—Some idea of the value to India of copper mines may be learned from the returns of the foreign trade. Last year India imported 354,107 cwt. of copper, valued at ₹1,51,18,162. The major portion (290,133 cwt.) came from the United Kingdom; Hong-Kong being next in importance (36,781 cwt.), and after that Japan (14,415 cwt.). By far the largest portion of these imports usually goes to Bombay (227,453 cwt.). The trade fluctuates very considerably, last year's transactions were the lowest during the past five years and the highest of that term were in 1893-94, *viz.*, 591,109 cwt.

Mixed or ***Yellow Metal*** for sheathing purposes, constitutes a very distinct item in these imports, *viz.*, 226,804 cwt. in 1893-94 and 179,261 cwt. in 1894-95. The total imports in ***Brass*** were last year 8,764 cwt. valued at ₹4,76,955.

CORUNDUM.

XVIII.—CORUNDUM (*Kurund, Hind.*).

135. ***OCCURRENCE.***—Corundum and Emery stone (Oxide of Aluminium) is very freely distributed among the crystalline rocks of Southern India, such as in the Travancore State, the Mysore State, Hyderabad (Kazipet), and in the districts of Coimbatore, Salem, Anantapur, North Arcot and South Canara of the Madras Presidency. A report recently published by Mr. C. S. Middlemiss of the Geological Survey (alluded to in last year's review), on the Corundum localities of Salem will be found instructive. Since the appearance of that report Mr. Middlemiss has extended his researches and greatly increased

thereby the previously known area of corundum in the district in question. The following passages may be abstracted from his most recent report, as showing the extent of the new discoveries:— CORUNDUM

Supplementary Report on some Corundum localities in the Salem District.

" Towards the end of the last field season, whilst traversing from Hosur to Royakotta, I found the biotite gneiss and the associated rocks and minerals gradually becoming more and more similar in character to those already observed by me near Paparapatti, where an extensive zone of corundum-bearing gneiss occurs (described in my previous report). I therefore kept a sharp look out and made diligent enquiries for corundum, and shortly after arriving at Royakotta I was shown several places a little east of that town where corundum was to be found. As the field season drew to an end, I was joined by Sethurama Rau, apprentice, and to him I entrusted the linking up of these Royakotta corundum areas with those of Paparapatti. In this he was fairly successful. The following notes are combined from his observations and mine along this line of country.

" The finding of these new localities entirely confirms a conclusion I had already arrived at as to the distribution of corundum, namely, that the gneiss fruitful in that mineral occurs in bands repeated by foldings of the rocks, and that very probably the lines of fruitful rock, which had continued as far as shown on the map, would continue further in the same direction in either continuous or broken out crop (pages 18, 19 of my previous report). In the tracing of part of sheet 27 of the Salem topograph survey, given with my former report, the area of corundum-bearing gneiss is shown to extend lengthwise for a distance of 8½ miles from near Ponnurnattam to the latitude of Pálakódu. The new observations carry on this line in unbroken continuity as far as a little north of Royakotta, making altogether a zone or strip of productive rock of about 24 miles in extent. Nevertheless a considerable gap occurs from near Chenampalli to about 1 mile south of Royakotta where, so far, no corundum has beer detected."

136. ***OUTTURN.***—The mines in Salem and South Canara are not worked, though they may be said to have great possibilities. Three tons are reported to have been quarried during 1894 and 13 tons in 1895 in the Madras Presidency. In Anantapur the industry is reported to be active during the rainy season, especially in one taluq. In Coimbatore and North Arcot, the right of collecting has been leased out for ₹1,625 per annum and for ₹2-4 per Indian maund, respectively, from the year 1893. An immense deposit exists near Pipra and Kodopani in South Rewah. There is a mine at Mouza which is said to have realized ₹547 in 1894. In the Nizám's Dominions corundum is found in the Khamameh and Nagar Kurnool districts, and some fine specimens have been found near the Kazipet Station of the Nizám's Guaranteed State Railway. At Yelgandal it is stated corundum was worked during 1895, the produce being valued at ₹21-4. In the Mysore State leases are sold by public auction.

The estimates of Mysore production during the years 1894 and 1895 were :—

	1893-94.		1894-95.	
	Quantity.	Value.	Quantity.	Value.
	Cwt.	₹	Cwt.	₹
Bangalore . .	Not asc ertained	402	Not ascertained	321
Kolar . . .	42	15	...	...
Tumkur . . .	713	2,708	560	2,133
Hassan . . .	111	318	210	630
Chitaldrug . .	2	10	2	8
	868*	3,453	772*	3,092

* The total involves an error (relative to value) through the yield of Bangalore not have been return ed.

137. ***USES.***—" The uses to which corundum is put, when powdered, are well known. The consumption in India must be considerable, though possibly it was larger formerly than it is at present, as the trade of the native armourer is perhaps not so active as it used to be. A large quantity is employed by the cutters and polishers of stones, both precious and ornamental, who are to be found scattered throughout India. To what extent Indian corundum is used in European countries is not very well known, but it could doubtless be applied to many of the purposes for which the emery of the Greek islands is now used, and which, owing to a monopoly at one time, reached the high price of ₹30 a ton in London." (Mr. Mallett in *Manual of Geology of India, Part III, page 422, IV.*) It is possible also to manufacture aluminium from corundum and in that direction a great future may be in store for the Indian fields.

XIX.—GYPSUM (*Kulnar: Kharayā mittī, Gach, Hind.*). GYPSUM.

138. ***OCCURRENCE.***—Gypsum occurs in the following localities:—(1) Trichinopoly, Madras; (2) Cutch and the Kirtha range of Sind, Bombay Presidency; (3) near Nagore in the Jodhpur State,

GYPSUM.

Rajputana; (4) Central India (Bijawar and Baraundha); (5) Bannu, Kohat, and the Salt Range, Panjab; (6) Kumaon and Garhwal, North-West Provinces; and (7) in the Pagan sub-division of Myingyan; it is not worked in Burma as it is of little or no value.

The mines in the Trichinopoly district are not worked and the quality of the gypsum found in the neighbourhood of Nagore is not as a general rule good, but in the excavation of a well in the Fatod pargana some of the finest specimens were found. They were, however, at too great a depth to be workable. The mines in the neighbourhood of Nagore are worked in the following manner:—Depressions where the gypsum is found are cleared of the surface sand and earth, and trenches are dug, from which the mineral is removed in the form of clods. The trenches being left untouched for two or three years and exposed to rain, fill up with gypsum, which is again removed. It is used generally as a cement where it not much exposed to atmospheric changes. The cement is prepared by burning. At present little gypsum is extracted but better results are now hoped for since the opening of the railway to Nagore, which will cheapen the carriage.

The salt in the Salt Range, Panjab, is overlaid by a deposit of gypsum some 15 or 20 feet thick—enough to supply the whole world.

139. ***OUTTURN.***—The production in the Rajputana States during 1894 was estimated at 3,169 tons, valued at ₹2,034, and for 1895 at 6,609 tons, valued at ₹3,478. In Bundelkhand the production in 1894 came to 118 tons, but in 1895 the production for the whole of Central India was given as 99 tons valued at ₹402. Of Panna (Bundelkhand) it is stated that the outturn had not been recorded, but that the revenue was ₹5.

Gypsum is not much utilised in India, though in many of the above-mentioned localities it may be had of good quality. In Bombay it sells at about ₹2 per hundredweight. It is a valuable manure, especially for leguminous crops, in the ash of which it is an important constituent.

LEAD.

XX.—LEAD ORES (*Sisa, Hind.*).

140. ***OCCURRENCE.—Madras.***—Extensive old workings occur at Guzalpali in the Kurnool district of Madras, but the mines are not worked at present. In the Bombay Presidency lead ores are found in the Panch Mahals and Narakot (Rewakántha) near the iron ores.

Bengal.—In Bengal deposits of galena are met with in the Bhagulpur district, and have been more or less worked at various times. Others are found at Dhadka in Manbhum; in the Monghyr district lead ore is met with in the stream beds of the Kharakpur hills near Gungta in the estate of the Maharajah of Darbhanga. This ore resembles *kankar* (*see page* 59) in appearance, the outer surface being carbonated, and it evidently has its origin from a bed or vein of sulphide, which has not, however, been searched for and located. Some years ago a European entered into an agreement with the proprietor of the Lachmipur estates in the Banka sub-division of the Bhagalpur district, Bengal, and commenced mining operations, but very soon discontinued his explorations.

Central Provinces.—In the Central Provinces lead ores have been found in the Sambalpur and Raipur districts.

Panjab.—Lead mines and works were started many years ago near Subathu in the Simla district, and mines have for long been worked by Natives in Sirmur.

Central India.—There are said to be two lead mines, one in Urgarh and the other in Kursa (Rewah State).

Rajputana.—Galena has been extracted in Ajmere, Alwar, Jhabua, and Udaipur, etc.

Burma.—There are old lead mines in the Mandalay and Katha districts of Upper Burma, but they are not now worked. A mine in Bawzaing, Southern Shan States, is, however, worked by a Chinaman to whom a five years' lease of 4½ square miles was granted in 1892.

Lead mining in India may, therefore, be said to be at present practically in a dormant condition.

141. ***TRADE.***—The foreign imports are fairly extensive; last year they were **112,550 cwt.**, valued at ₹16,19,320. Of that amount the major portion is returned under "Sheets for tea chests," *viz.*, 78,905 cwt., valued at ₹12,24,223, the bulk of which naturally was received by Calcutta.

MAGNESIA.

XXI.—MAGNESIA MINERALS (*Zahr mohra; fulzát, Hind*).

142. The very extensive occurrence of magnesite in the chalk hills close to Salem, in the Madras Presidency, is noteworthy, but this valuable supply is not at present utilized. The reader should consult the Report issued by Mr. C. S. Middlemiss of the Geological Survey.

Veins of this mineral are also met with in Arakan and in Manipur, as also traces near Mussoorie. Near the Happy Valley in the latter district, three outcrops, four feet thick,—a mixture of fine white powder and of coarser rock—have been discovered. Twenty per cent. of the coarse rock obtained contained nearly equal quantities of magnesium carbonate and calcium carbonate. The white powder amounted to 80 per cent., and by analysis was found to be composed as follows:—Silica, etc., 6; Alumina ferric oxide, etc., 3; Calcium carbonate, 7; Magnesium carbonate, 84; Total 100.

MANGANESE.

XXII.—MANGANESE ORES (*Kolsa-ka-pathar, Hind.*).

143. ***OCCURRENCE.***—Manganese deposits exist along the East Coast Railway in the Vizianagram State, Vizagapatam district, and are found in large quantities in the Chipurupalle taluq of that State. They are chiefly found in "pockets" close to the surface, and are reported to be of good quality.

His Highness the Maharajah of Vizianagram has commenced to work them, and some experimental shipments were last year reported to have been made to England. Since that date the trade has considerably expanded and may be regarded as fairly well established. Mr. James Grundy in his last year's report mentions having visited these new mines at Kodur near Cheepurupalli about one mile from the Garividi Station, East Coast Railway.

Manganese ores are found also in the trap rocks of Belgaum, Dharwar, and Ratnagiri districts in the Bombay Presidency. Jhabua in Central India is also said to possess valuable supplies of this mineral, which are not as yet employed industrially. But the most famous and in some respects perhaps the most hopeful locality for future development is Gosalpur in the Jabalpur district of the Central Provinces. It has been reported that a lease has been granted of these mines to a European firm, but in the returns of 1895 no mention is made of any progress. Last year's Review stated that the ore was extracted by labourers who wash it in the Hiran stream before exportation.

An extensive bed of ore—thought to be of several square miles in extent—has been reported to exist in Lower Burma. It unites three localities: the bank of the Thugoo stream, the bank of the Thirabuen and the Great Tenasserim river. The ores are stated to consist of black and grey oxides and wad.

144. ***OUTTURN.***—During the year 1895 the Madras Presidency is said to have produced 15,816 tons, but the published exports from Madras for that year came to 22,758 tons, as will be seen from the following statement:—

Exports of Manganese Ore from British India by Sea to other Countries during the past four years:—

From		COUNTRIES TO WHICH EXPORTED.							
		UNITED KINGDOM.		FRANCE.		UNITED STATES.		TOTAL.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		Cwt.	₹	Cwt.	₹	Cwt.	₹	Cwt.	₹
Madras	1892-93	20,000	8,000	...	...	...	...	20,000	8,000
	1893-94	33,000	13,200	...	...	...	...	33,000	13,200
	1894-95	122,320	48,928	6,000	2,400	...	...	128,320	51,328
	1895-96	387,160	1,54,864	...	...	68,000	27,200	455,160	1,82,064

So far as is known no other province than Madras exports this mineral. The trade, as already remarked, is a new one and one that will be seen to have made remarkable progress during the past four years.

XXIII.—MICA (*Abrak, Hind.*).

145. ***OCCURRENCE.—Bengal.***—Commercially Mica is sometimes spoken of in India as Talc, though mica and talc are different minerals. The former is elastic and cleavable into sheets, the latter flexible and seldom in sheets or scales (*Conf. with Soapstone*). The main region of mica production is in the Hazaribágh district of Bengal where the mines in the Koderma Government estates and in the Gadis-Gawan are being utilised. It is also found in the Gya, Monghyr, and Bhagalpur districts of the same province, but only two mines, *viz.*, one at Sapahi and one at Singar in the Gya district, are now worked.

Madras.—Mica is met with in the Nellore and Coimbatore districts of the Madras Presidency, but the mines in the latter district are not worked, as the industry is not sufficiently remunerative. The mines in the Nellore district have been favourably reported on.

Sind and Rajputana.—Mica is found in the Shabhabunda taluq of the Karachi district of Sind; in the Kishengarh State of Rajputana; and near Jambagaun, 20 miles west of Chota Udaipur in Rewakantha. The Kishengarh mica is said to be not very pure, and to occur in pieces not large enough for trade.

Nizam's Dominions.—The Hyderabad mines have been considerably worked by the Hyderabad (Deccan) Company, but the variety of mica chiefly met with is biotite, and is generally so largely impregnated with iron as to be of inferior commercial value.

Mysore.—Mica occurs also in the Mysore State and in Burma. In the latter province the mineral is found in the Ruby Mines district, near Chaukkyi in the Twinngé township, and in various parts of Mogôk township.

146. ***OUTTURN.***—The estimated production during 1894 was 180 tons, valued at ₹1,45,388, but in 1895 the output came to 375·9 tons, valued at ₹3,16,614. These figures would thus represent an expansion of 108·8 per cent. on the quantity and 117·7 per cent. on the value. It seems more than likely, however, that the improvement is mainly in more accurate returns. In last year's review it was pointed out that the declared production for some years past had rarely been more than one half the quantities shown to be exported. The figures of production were last year considerably in excess of the demands of the foreign trade and would thus appear to be very possibly correct. The total number of persons employed on the Hazaribágh mica mines (or rather quarries) has been returned at 1,932 permanently, 706 temporary. Mr. James Grundy (*Report of the Inspection of Mines in India, 1895*) enumerates these mines. He shows 208 in

MICA.

the Hazaribágh district of Chutia Nagpur, Bengal. The largest owners of these would appear to be Messrs. F. F. Christein & Co. of Tisrí *viâ* Bhurai with 110, mines; Mr. W. R. Macdonald of Koderma with 28 mines; Babu Raj Krishna Sahana of Koderma with 31 mines; Mr. W. D. Clyburn of Koderma with 13 mines; Mr. C. A. Dickson of Koderma with 9 mines; Babu Nund Lal of Domechanch with 3 mines; Tikait Thakur Narang Singh of Ghorunji with 8 mines; and several other smaller owners with each one or two mines. In the Monghyr district of Bengal Mr. Grundy shows 4 mines of which the following may be mentioned:—The New Indian Mica Company; Messrs. F. F. Christein & Co.; and Mr. C. W. F. Buckland and E. M. Floyed. In the Gya district Mr. Grundy mentions two Mica mines, *viz.*, the Sapahi mine owned by Babu Dirgopal Lal and the Singar mine leased by Messrs. Christein & Co.

Of the Nellore district, Madras, Mr. Grundy refers to 4 mica mines 3 of which are owned by Messrs. Kudah Budusha Company, Madras, and the fourth by Mr. K. Munisami Iyer of Madras.

147. ***PROSPECTS.***—The method of working is not the same in all the mica-producing districts. For instance, in Gya the quarries are worked by manual labour and blasting. In Monghyr they are formed by means of iron crowbars and the rocks are sometimes blasted by dynamite, and the strata of mica thus removed. Where the surface gives indications of mica, pits are frequently sunk. In Hazaribágh, the mines are worked in the Native fashion by means of pits, and no European machinery or contrivances are resorted to. The industry cannot be said to be in a very flourishing condition in the Nellore district of the Madras Presidency. Indeed, most of the workings have proved unsuccessful, and many persons who have obtained leases to work the mineral have had them cancelled.

148. ***TRADE.***—The demands for Indian mica continue to increase as the uses of the mineral are extended for electrical purposes, for gas furnaces, for cooking stoves, lamps, and the like.

The following statement may be given of the Foreign traffic in mica:—

Exports of Mica from India and the Countries to which exported.

Provinces from which exported.	1890-91.		1891-92.		1892-93.		1893-94.		1894-95.	
	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
Bengal . . .	6,351	9,12,450	2,298	4,28,393	3,310	4,33,772	4,843	7,65,879	5,126	6,04,719
Bombay . . .	33	575	27	314	18	511	5	120	10	879
Burma . . .	...	...	...	...	1	65	6	700	6	712
TOTAL .	6,384	9,13,025	2,325	4,28,707	3,329	4,34,348	4,854	7,66,699	5,142	6,06,310

Countries to which exported.	1890-91.		1891-92.		1892-93.		1893-94.		1894-95.	
	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
United Kingdom .	3,248	4,48,864	819	1,18,932	1,388	2,40,952	2,598	5,28,514	3,039	2,78,135
France . . .	8	785	10	1,340	...	...	26	8,150	20	5,050
Germany . .	170	34,363	73	17,425	5	764	169	33,518	92	28,038
Egypt . . .	...	...	12	120	...	...	...	...	....	....
Mauritius . .	...	...	...	...	...	...	...	...	...	...
Austria . . .	...	...	...	...	100	236	...	...	4	1,747
United States .	2,947	4,28,878	1,401	2,90,806	1,834	1,92,380	2,061	1,96,517	1,937	2,91,940
Arabia . . .	...	...	10	84	...	...	...	...	...	...
Straits Settlements .	11	135	...	...	...	...	...	...	24	228
Natal . . .	...	...	...	...	2	16	...	...	...	...
Other Countries .	...	...	...	...	...	...	...	...	26	1,172
TOTAL .	6,384	9,13,025	2,325	4,28,707	3,329	4,34,348	4,854	7,66,699	5,142	6,06,310

149. The following passages are taken from the provincial reports for 1895 by way of amplifying the particulars above.

Bengal.—In the Nawadah sub-division of the Gya district there were three mines at work, *viz.*, (1) at Singar, (2) at Chatkari, and (3) at Sapahi. The estimated production at Singar and Chatkari is 30½ tons, valued at ₹16,502, and at Sapahi 15¾ tons, valued at ₹24,590. The mica mines at Chatkari were worked from the 9th December last only, and the outturn for 1895 is returned as one maund (·03 tons).

The reason given for the decline in the outturn of the Singar mines is that they are almost exhausted. The estimated production in Monghyr is 4 tons, valued at about ₹1,500. The estimated production in Hazaribagh is 297·9 tons valued at ₹2,73,698-6-10.

Burma.—*Ruby Mines.*—About seven or eight men were engaged in extracting mica during 1895. About 32½ cwt. of marketable quality, valued at ₹80, was obtained.

Madras.—Of very inferior quality available in considerable quantities at Kodur and between it and Chipurupalle in Vizagapatam, but not of marketable value and not worked.

The mineral is also found in certain places of South-East Wynaad in the Nilgiri district, but is not worked. Production 23 tons.

Mysore.—Estimated production 61 cwt., valued at ₹244.

Grants and Licenses since 1889.—It will be seen in the Appendix that 69 mining and prospecting grants and licenses have been issued, 36 being in 1895. It may in fact be said that comparatively speaking greater activity has been shown with mica than with any other mineral.

XXIV.—PLUMBAGO (*Sisa, Hind.*).

150. ***OCCURRENCE.***—The localities where Plumbago (Graphite) has perhaps been found most abundantly in India are in the Madras Presidency, especially in Travancore, where the mineral is of better quality than elsewhere, although apparently inferior to that worked in Ceylon. In Travancore the mineral is found in Vallanad in the Neduvengad taluq. It is worked by sinking shafts in the veins and sloping away intermediate blocks of vein, which are subsequently filled up with rubble from the surface. A poor quality of graphite occurs in the Vizagapatam district. An announcement last year of recent discoveries of plumbago in the Godavari district excited considerable interest. It may, therefore, be useful to quote in this place the official information to hand on that discovery. "Adverting to Board's memorandum, No. 1759 Mis., dated 9th April 1896, I have the honour to state that good graphite is obtainable in several parts of the Bhadrachalam taluq and in the Rampa Agency. The partners of Messrs. Binny & Co. of Madras and those of Messrs. Hall, Wilson & Co. of Cocanada have applied to me for licenses to prospect for this mineral in the villages of Peddakonda in the Bhadrachalam taluq and in Yerramattaloo in the Rampa Agency. Licenses to prospect for the mineral in the former village have been issued to them for a period of six months commencing from 13th February 1896. The Special Assistant Agent has recently sent to me a quantity of black earth resembling graphite, procurable from a hill known as Korukonda Hill in the Rampa Agency. I have sent it to the Chemical Examiner to the Government of Madras for analysis. No reply has yet been received from him."

Plumbago has been found to occur in a considerable bed at a place called Mulkanoor in Hyderabad. In Bengal it is found at Kakwara in South Bhagulpur, and is said to be met with in the Banka sub-division of the same district. The search made at Kakwara to find larger deposits has not been successful.

It may thus be added in conclusion, on the subject of the Indian sources of this mineral, that masses of several pounds' weight, much mixed with earthy matters, have been met with in places wide apart, but no vein or shoot of any extent has as yet been discove red.

151. ***OUTTURN.***—The quantity produced in 1894, at Travancore, was 1,597 tons, the value of which is not stated; returns for 1895 have not been furnished. Regular mining is carried on, but the industry is depressed through the inferior quality of the mineral, though it is available in abundance.

XXV.—SOAPSTONE—(*Abrak Hind.*) STEATITE or MASSIVE TALC.

152. ***OCCURRENCE.***—The common coarse variety of this mineral is known as Potspone.

Madras.—The finer forms of the rock for which there is a demand in England, are not very extensively met with in India; the best occurs near Betumcherla in the Kurnool district of the Madras Presidency. Following that, the soapstones of Anantapur, Bellary, Cuddapah, Salem, Malabar, Nellore, and South Kanara districts may be mentioned. There is no established industry in the soapstone of Anantapur and Kurnool, the mineral-bearing localities being, in fact, included in the forest reserves. The stone has been worked for several years, however, under forest permits in Sydapuram village of the Nellore district, where the yield is said to be inexhaustible. The excavation of the stone constitutes the only source of living to a large number of families in the villages where it occurs. Some speculators applied for mining rights under the lease system, but in consideration of the stone affording a living to the villagers the permit system has been kept in force.

In two villages of Cuddapah, quarrying of soapstone is carried on on a somewhat large scale. The stone is found on the sides of hills at a small depth from the surface and is dug out by means of crowbars. The working season is between January and July, and two to sixteen cart-loads of 33 maunds each are quarried in the course of a month.

INDIAN USES.—In Salem potstone is excavated and chiselled into culinary utensils of various sizes by professional workers, and these vessels are exported to different districts. There is a regular industry in these commodities. The trade in Bellary stone vessels has not been flourishing as there is not much demand for the articles. The stones from Cuddapah are used for polishing the walls of buildings, and are chiefly sent to Madras, where there is a great demand for this kind of work. Specially prepared pieces are also employed as pencils for writing on slates.

The quantity of soapstones produced during 1891-92 was 321 tons. Separate returns for 1894 were not

SOAPSTONE. available but it is stated that the total production of the presidency including the Native States was last year (1895) 103 tons.

Bombay.—The stone in Malabar is said to be very gritty. It is found in the Dharwar, Belgaum Kolhapur, Ratnagiri, and Kanara districts of the Bombay Presidency.

Bengal and North-West Provinces.—In Bengal soapstone is met with in the Manbhum district. It is also found in the Jhansi district of the North-West Provinces, at the Hamirpur and the Lalitpur sub-divisions. The total production in 1894 was estimated at 92 tons and in 1895, at 59 tons. The stone is obtained from open workings and is made into cups, images, and the like. The industry, however, is of very trifling character.

Central Provinces; Rajputana and Central India.—The marble rocks in the Jabalpur district and Kanheri in the Bhandara district of the Central Provinces give capital stone. In fact the next best localities are in the Jaipur State of Rajputana. The mineral also occurs in the Bundelkhand States of the Central India Agency as, for example, at Orchha and Bijawar. The revenue from the stone in the former was last year ₹1,801, and in the latter the production was 8·7 tons, valued at ₹787-8.

Burma.—There are mines for soapstone in the Prome, Pakôkku, Katha, Bhamo, Kyaukpyu, and Minbu districts of Burma. On the hills round Prome it lies about a foot-and-a-half below the surface. The Minbu quarries and those in Kyaukpyu district are all in a group on the borders of Arakan and Upper Burma. The steatite occurs in veins of 6 inches to a foot thick. In the Bhamo district soapstone is met with to the north and north-east of the Jade and Amber mines, and in another distant locality far up the Irrawaddy. Several of the Minbu quarries are annually leased to Burmans, the leases being disposed of by auction. In some cases, besides a lump sum down, a royalty on the outturn varying from 10 to 20 per cent. is reserved to Government.

153. ***OUTTURN.***—The Burmese (Minbu) production in 1894 was 16 tons, valued at ₹12,500. In 1895 the production was said to have been 19 tons, valued at ₹3,750. No explanation is offered as to the reason of the difference in the valuation as compared with the returns of 1894. During 1894 the outturn in Hyderabad was put at ₹117 worth and in 1895 at ₹114. Particulars as to quantity are not available since the sums mentioned were the license fees for permission to work the mines. The soapstone produced in the Mysore State in 1894 was estimated at 597 tons, value ₹2,252, and in 1895 at 4,300 cwt., valued at ₹950. The production in the Madras Presidency in 1894 was put at 58 tons and in 1895 at 103 tons. The value of the outturn in Bundelkhand, Central India, for 1894 was estimated at ₹2,025. Figures showing total quantity produced are not given. The total number of persons employed at Steatite mines (permanently and temporarily) has been returned at 200.

154. ***USES.***—The modern European demand for steatite to be used in the manufacture of gas burners and other purposes is considerable. But for burners steatite that can stand a high temperature is essential and it must be fine in texture and free from grit. In testing for quality the mineral should be broken across the grain to see that it is not flaky or scaly. From recent reports on this subject it seems likely that the future may see a greatly extended foreign demand, in competition with the steatite obtained from Germany.

XXVI.—TIN ORES (*Rang, Kallai, Hind.*).

TIN ORES.

155. ***OCCURRENCE.***—These are only known as yet to occur in any very promising quantity in Maliwun sub-division of the Mergui district of Lower Burma, where the mines are in a portion of the great stanniferous belt that stretches along the granite backbone of the Malay peninsula with scarcely an interruption. In Mergui they extend continuously in fact from the Siamese frontier along the whole seaboard to at least the latitude of Tavoy, beyond which the great gigantic axials disappear below the greater overlying deposits of more recent stratified rocks that sweep southward. The interior is but little known and it seems that the heaviest out-crops of the granite, with which the tin is associated, are the more plentiful towards the coast.

Judging, however, from the fact that heavy tin is worked on a commercial scale at Thibawleik in the Tenasserim valley, and that tin is found in the Siamese States of Bantaphan, of Chomphom, and Faungswan, along the Gulf of Siam, it is hoped that the main watershed may be found to throw off spurs of stanniferous granite at least as valuable as the out-crops in the secondary axials along the coast. In the Maliwun sub-division there are four main centres at which tin is worked, though these form practically the four earliest points of attack along a more or less continuous stanniferous belt, running for 200 miles north and south, with a mean width of perhaps 20 miles.

The main points give their names to the four principal fields :—

(1) Maliwun.	(3) Bokpyin.
(2) Karathuni, Banhuni.	(4) Migyaungchaung, Yayugon.

In these and all other fields the tin occurs in more or less imperfect fissure lodes, frequently shattered and distorted by more recent movements, which (as at Maliwun and Renaung) are not unseldom accompanied by silicious hot springs, probably rising on the lines of *fault* through which the tin has penetrated. Occasionally also they permeate the metamorphic rock through which the granite has been upheaved.

The lodes, except Khowmaung near Maliwun, where a few Chinese have been for some time picking at the out-crop with crowbars, are not worked commercially; specimens of heavy tin ores received from Hangpon, Bokpyin, Sadein, and Thibawleik prove these lodes to be widely distributed. The alluvial tin has been derived from these lodes by the gradual denudation of the hills containing them, and is now deposited in the form of a more or less coarse sand mingling with the gravels and other alluvial deposits in the river valleys and gentle slopes at the foot of the granitic hills.

In this operations are carried on by a simple process of alluvial working, ranging from the rude methods of the "Tampan" (= hill, a Chinese word) worker, who contents himself with "fossicking" in the narrow hill valleys, to the larger open mines on the plains, where immense gravel pits are opened, and the "Karang" (or pay dirt) is raised from depths of sometimes as much as 30 feet. This *karang* contains the tin oxide which is separated from it by working. The ore is then smelted with charcoal in a small open blast furnace of the pattern known as the *pon-kah* furnace.

156. ***OUTTURN.***—The total output in 1894 was 98 tons, valued at ₹1,08,700, of which 81⅛ tons were exported, valued at ₹89,650. The balance, 16⅛ tons, were kept for export in 1895, the market having fallen towards the end of the year, The *Financial and Commercial Statistics of British India for 1894* show the production having been only 22⅛ tons, valued at ₹25,582. The returns furnished to this office by the Burma Government as the Mergui production of 1895, come to 438 cwt., valued at ₹23,464. There would thus appear to be some mistake, and it is perhaps safer for the present to disregard the quotations of production.

The industry, which has been for many years in a depressed condition, was last year thought to be reviving. The returns of this year are not very encouraging. It is difficult to say how many persons are actually employed in this industry since the bulk of the extra hands employed in the rains are as much fishermen or agriculturists as miners. The returns show for 1893-94 that 407 persons permanently employed and 205 temporarily. In 1895 the figures were 83 and 97, respectively. A great stimulus was thought to have been given to the tin industry by the grant of a lease to Captain Menzell of Singapore. The lease was granted in 1892 and conveyed to the Captain exclusive rights for five years of mining for tin inthe Maliwun township, except in areas occupied by Native miners. On the expiry of that period a lease for 21 years was granted to Captain Menzell on the condition that he had worked his five years' concession in a satisfactory manner. Captain Menzel began operations by importing a number of Chinese miners from the Straits Settlements, and he is said to have been hopeful to increase the number of his miners and develop the concession rapidly.

157. ***TRADE.***—The trade in tin consists for the most part of imports from foreign countries. During the past five years these have averaged 40,832 cwt., valued at ₹29,01,581. The imports in 1893-94 and of 1894-95 and the countries from which these supplies were drawn are shown by the following table :—

Imports of Tin, 1893-94 and 1894-95.

Countries whence imported.	1893-94.		1894-95.		Share taken by each Province.	1893-94.		1894-95.	
	Quantity.	Value.	Quantity.	Value.	Province.	Quantity.	Value.	Quantity.	Value.
	Cwt.	₹	Cwt.	₹		Cwt.	₹	Cwt.	₹
United Kingdom .	1,572	1,13,889	2,947	89,459	Bengal .	25,386	18,20,208	27,724	18,06,505
Ceylon . .	83	4,414	20	1,474	Bombay .	14,931	10,74,410	14,455	97,89,932
China—Hongkong .	37	2,834	8	630	Sind .	1	100	...	...
Straits Settlements	44,208	31,54,004	45,444	31,14,782	Madras .	4,663	3,14,242	5,206	3,56,602
Other Countries .	6	576	6	658	Burma .	925	66,757	1,040	45,564
TOTAL .	45,906	32,75,717	48,425	32,07,003	TOTAL .	45,906	32,75,717	48,425	32,07,003

The exports of tin were last year 50 cwt. of ore to the Straits Settlements from Burma and 1,351 cwt. block tin also from Burma and mainly to the Straits with 4 cwt. from Sind. The exports were thus more than three and a half times the total quantity reported as produced—a fact that might be accounted for by their being exports of surplus stock.

XXIX.—SALTPETRE or NITRE (*Shórá, Hind.*).

158. ***OCCURRENCE.***—The Saltpetre of Indian commerce is derived mainly from Behar (chiefly Tirhut, Saran, and Champaran), and to a very much less extent from the North-West Provinces (Cawnpore, Ghazipur, Allahabad, and Benares), with a small amount from the Panjab, Central India, Bombay, Madras (Coimbatore, Kistna, Trichinopoly, etc.), and from Burma.

Under the name of *Shórá*, it occurs as a natural efflorescence on the surface of the ground. It is in that condition mixed with several other salts, chiefly the chlorides of potassium and sodium, nirate of lime, and sulphate of soda. The last-mentioned salt is, as a rule, the most abundant. But the saltpetre lies as

it were in patches, some parts of the efflorescence being more productive than others, according as carbonate of lime and sand predominate. [For some particulars of the common salt prepared at saltpetre refineries see pages 6 and 8.]

159. ***REFINING.***—The *Loneahs* (or rather *Núniahs*) or Native manufacturers of saltpetre commence operations in November by scraping off the surface soil from waste ground, mud, buildings, etc. This is then purified by solution and filtration, the principle involved in the purification being the varying rates of solubility of the salts at different temperatures. The next stage is to evaporate the saltpetre liquor to a crystallising state. This is generally accomplished from April to June. For this purpose the liquor is put into earthen pots fixed in two rows over an oblong trench dug in the ground. The interspaces between the pots are filled in with clay and an aperture left at the further end to allow of the escape of smoke, so that the contrivance becomes converted into a crude furnace. The fuel employed is generally the dry fallen leaves of the mango tree. In the North-West Provinces and Oudh the brine, instead of being evaporated and concentrated by artificial heat, is often placed in shallow *chunam* pans and there allowed to evaporate through the heat of the sun. This process is slower but less expensive and the result is the same.

After evaporation has been carried to the crystallisation stage, the liquor is removed and the salt allowed to deposit on cooling. Glue is not employed in India to assist in the separation of the extractive matters. The saltpetre manufacture in this way is for the most part a crude article which has again to be refined at the Calcutta refineries. "To make refined saltpetre, crude saltpetre is merely dissolved either in a menstrum of water or saturated brine, and, the foreign salts being removed by precipitation in the process of boiling, the saltpetre brine thus freed from impure or foreign salt is strained and purified and set to clear, and is cooled until the crystals of pure saltpetre are completely formed. These are collected, washed in water or alum water, drained and dried. They are then fit for the market and are often found to possess a high degree of purity. The foreign substances removed by precipitation is chiefly common salt." The area over which saltpetre is manufactured has been estimated at 232,314 square miles. In 1892-93 there were 543 licensed refineries and 44,925 licensed works, for the manufacture of crude saltpetre. In that year the manufacture came to 48,800 tons of crude saltpetre, of which 47,580 tons were purchased by the refineries and purified—yielding rather over 27,580 tons of refined saltpetre (*Systems and Practice of Salt Administration in India*).

The *Financial and Commercial Statistics* for British India for 1895 show 310 refineries in Bengal that give employment to 3,104 permanent staff and 1,713 temporary. In Madras the corresponding figures would appear to be 1,188 refineries (1,135? of which are in Coimbatore) employing 52 permanent staff and 136 temporary. In the Panjab there is only one refinery (the Saltpetre Factory at Hodal) that gives employment to 25 persons. The Census of 1891 puts the saltpetre workers and sellers for all India at 119,558, of whom 2,631 were recorded as residing in Native States.

160. ***TRADE IN SALTPETRE.***—The following passage from Mr. J. E. O'Conor's *Review of the Trade of India* for 1894-95 may be quoted as not only showing the position of the foreign trade in this mineral but as exemplifying certain interesting particulars:—

"***Saltpetre*** is the only chemical product of any importance exported from India, the trade in borax having dwindled to insignificance, in face of the competition of Italy and the United States. Saltpetre also has to contend against such keen competition that it can make practically no headway, the trade having for a great many years fluctuated within certain well-marked limits. In the last five years the trade has been as follows:—

	Cwt.	₹
1890-91	399,690	3,80,059
1891-92	389,185	3,65,618
1892-93	443,931	4,38,940
1893-94	321,933	3,38,102
1894-95	352,985	4,11,365

With the gradual supersession of that form of gunpowder in which saltpetre is an essential ingredient, by explosives made of other substances, and with the increasing use of frozen and chilled meats in supersession of preserved meats, the uses of saltpetre are gradually narrowing, and it is unlikely that we shall ever see a large expansion of our trade unless indeed some entirely new and extensive use for saltpetre is discovered. What is more probable, perhaps, is the slow reduction of the trade in the not very remote future to the quantity which the Chinese will continue to take for the manufacture of fire-works. In that case this industry will be added to the list of the old industries in which India was once pre-eminent, which have stagnated and then decayed."

The following tables classify the above exports of saltpetre from India during the past five years under the provinces from which exported and the chief countries to which exported:—

Exports of Saltpetre from India and the Countries to which exported.

Provinces from which exported.	1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Bengal	398,287	386,366	438,408	320,438	350,604
Madras	209	89	46	6	62
Bombay	647	385	1,194	796	958
Sind	547	2,345	4,283	693	1,361
Burma	...	...	...	...	...
TOTAL	399,690	389,185	443,931	321,933	352,985

Exports of Saltpetre from India and the Countries to which exports.—contd.

Countries to which exported.	1889-90.	1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
United Kingdom . . .	167,052	136,904	130,923	153,108	123,322	114,003
United States . . .	90,981	132,304	116,172	142,830	65,340	86,711
Hongkong	76,872	82,350	78,632	83,864	63,115	88,015
France	34,949	5,971	10,185	6,876	8,751	5,723
Mauritius	21,400	24,908	30,552	31,345	33,437	32,358
Straits Settlements . .	17,929	7,625	11,285	12,881	14,811	11,649
Australia	895	1,707	1,462	530	601	687
All other Countries . .	12,151	7,921	9,974	12,497	12,556	13,839
TOTAL .	422,229	399,690	389,185	443,931	321,933	352,985

XXVIII.—FULLER'S-EARTH (*Sabún-mitti, Multani-mitti, Hind.*).

161. ***OCCURRENCE.***—As regards the distribution of Fuller's-Earth in India, information is very incomplete. It is known, however, to be carried for long distances from certain localities where it occurs, as, for example, in the Bhagalpur Division of Bengal. In the neighbourhood of Colgong, a soap-earth is obtained. In Rajputana a fuller's-earth used to be procured from fissures in quartz and schistose rocks. In some parts of Western Sind a pale-greenish clay is found which is used for washing cloth, etc. In Hyderabad (Sind) there is in fact said to be a fuller's-earth mine situate in the Hala sub-division. In the Panjab, in Dera Ghazi Khan and Multan districts, a clay resembling fuller's-earth is imported from the interior of the Suleman Range and conveyed all over India under the name of *Multani-mitti*. At Nilawan, in the Salt Range, a lavender-coloured clay or decomposed rock is employed by the Natives as a fuller's-earth. Rajputana, especially in the States of Bikanír and Jeysalmír, has rich deposits of fuller's-earth. At Mandhan and Nedai (Jeysalmír) there are two quarries. The clay is found in thin layers. It is carefully extracted and used for washing the hair without any preparation. The *geru* clay also found in that State (to the south-east) occurs in small lumps. These are used by the *Sadhus* to dye their cloths and by the Government to dye tent cloth. *Seri-mitti* is also met with. This exists as lumps that are regularly collected and used in white-washing houses. The production fuller's-earth from the Bikanír mines were last year 39,723 tons, valued at R15,332. The quarry at Meth in Bikanír is 36,000 feet long, 18,000 feet wide, and 8 feet deep. It has been in existence a long time and will last for an indefinite period. The quarry is worked by pick-axes. The quantity excavated annually is not fixed, but varies according to demand. About 2,000 camel loads are usually carried annually to Sirsa.

162. ***Soapsand*** is found in Burma, in the Myingyan district. The production in 1894 was 190 tons. The production in 1895 was 197 tons, valued at R498. The rise in value is due to a better quality of soap-sand having been obtained during the year.

Most of these clays are employed for cleaning the hair, dyeing cloths and weighting paper, but in Manipur a clay of a similar nature is spoken of as edible.

XXVII.—MINERAL PAINT and OCHRE (*Gerú, Hind.*).

163. ***OCCURRENCE.***—Mineral paint of a slatish colour is found in a vein technically termed "fault" commencing from the northern extremity of the Kishengarh hill, in Rajputana, and extending, at least so far as has been hitherto ascertained, for several miles in the north-easterly direction. It has been found to be a good substance for painting wagons, iron work, iron bridges, etc., and the sides of ships. As it has been found by an analysis in the Geological Survey Department of the Government of India to contain very little iron, and the iron being in the state of peroxide, there is no further room, it is stated, left for oxidation or rusting. Samples have been sent to various places both in England and India, but no market has as yet been created for it. It has, however, been approved by the Rajputana-Malwa Railway, and a small paint-manufacturing machine has been erected at their workshops for making paint of the mineral.

164. ***OCHRE***—Found in parts of the Meywar State, Rajputana. In 1894, three-and-a-half tons were obtained, valued at R5, and in 1895, 17 cwt., valued at R1-4. In Hyderabad, Deccan, red ochre is met with. The quantity produced in 1894 was valued at R28 and that for 1895 at R30. It is explained that the quantity cannot be stated as the mines are given out on contract. Red ochre is also found at Baraundha in Bundelkhand, Central India Agency, where the outturn in 1894 was estimated at 13 tons, value R62, and in 1895 at 5673 tons, valued at R681-12. Figures showing quantity for all India are not available.

SODA SALTS.

XXX.—SODA SALTS (*Khari-nun; and Sajji, Hind.*) (Other than Common Salt).

OCCURRENCE—In very many districts of IndiaSulphate and Carbonate of Soda are manufactured from the surface soil or saline efflorescence, and the Carbonate as Barilla is also prepared by incineration of certain plants known as saltworts.

165. The ***Sulphate*** known as *Khari* or *Khari-nun* or *Chamra-khari* is prepared either by solar evaporation (*abi*) or by the use of artificial heat (*jaria*). The salt known as *patna-khari* is a pure form of sulphate produced by first burning the efflorescence with alternate layers of rice straw, then lixiviating the calcined mass.

Sulphate of Soda, prepared by one or other of these methods, is an article of local trade in Behar, Fattehpur, Etah, Bulandshahr, Hurdui, Patiala, etc. It is chiefly used in hide curing.

166. The ***Carbonate.***—(*Sajji*) exists either as natural mineral obtained from saline efflorescence or as Barilla derived from the ashes of certain plants. To obtain the former, shallow basins are formed, about ten yards square. Into these beds water is admitted to a depth of two or three inches. The soda efflorescence of the neighbourhood is then thrown into the water until a thick pasty mass is produced. This is smoothed over and in a week's time a concentrated efflorescence forms on the surface. This is collected by the hand and is known as *papri-sajji*. To make *sajji* the *papri* is again dissolved and boiled in earthen vessels until the impure carbonate forms into a hard mass.

In 1891-92 there were 2,266 works licensed to manufacture *khari*; 1,183 to make *sajji*; and 55 to make *rassi*. During that year 9,150 tons of *khari* and about 6,405 tons of *rassi*, and *sajji* were manufactured. The following passage on the manufacture of these crude soda salts may be given :—

"***Khari*** (or sulphate of soda) and *rassi* and *sajji* (or impure carbonates of soda) are prepared by a process very similar to that by which crude saltpetre is produced. The quality of the earth collected is of course different in each case, but the nature of the filters, boilers and pans employed is the same; and for evaporation and condensation of the brine, boilers and *chunam* pans are both used, the former in Behar and the latter in the North-West Provinces and Oudh, where prolonged dry hot weather may be more confidently reckoned on than in Behar. *Patna khari*, as the *khari* produced in Behar is called, is used chiefly or preserving hides, and also as a cathartic for cattle, and sells at from 8 to 12 annas a maund. It contains very little sodic chloride. *Khari* produced up-country by solar evaporation is much used as a cathartic for cattle. It contains a considerable percentage of common salt (20 to 30, and sometimes even more, per cent.), and realises from 12 annas to a rupee per maund. *Rassi* and *sajji* are used by dyers and soap-makers and also by tobacconists as an ingredient in the preparation of *hukka* tobacco. The price ranges from 12 annas to ₹1-4-0 per maund."

167. ***Barilla***—is chiefly manufactured in the Panjab from various plants known generically as *lání*. These are burned in pits in successive relays until a sufficient amount of ash has been accumulated. The ash is then covered with a thin layer of earth to prevent loss by evaporation and is left to cool. After about a week the layer of ash in the bottom of each pit is found to be a hard mass of *sajji*.

168. ***Black Salts.***—(*Kala-nun*) is an article of some importance in local markets of India. It is prepared in Upper India chiefly at Bhewani in Hissar. Common salt is heated with the chebulic and emblic myrobalans together with *sajji*, until a sort of fusion takes place. The article so manufactured is used as a medicine.

Although a few of the provincial returns make mention of the soda salts, definite statistics have not been furnished. The above remarks have been thrown together partly to indicate the regions where these salts are obtainable, and partly in order to establish a position where in future Reviews mention may be made of the extent of the traffic in these minerals.

CLAY.

QUARRY STONES.

XXXI.—CLAY (BRICKS, TILES, POTTERY) (*Chikni-mitti, Hind*).

169. ***OCCURRENCE.***—Brick, fire, and pottery clays are pretty generally distributed. The most valuable pottery clays occur in Jabalpur. Clay of a very fine character is also found in Raniganj, Bengal. Large pottery works on the European system have for some years been in operation, both at Jabalpur and Raniganj.

Bengal.—The following particulars have been furnished by the Government :—The estimated production of clays in Burdwan, used by Messrs. Burn & Co. in their Pottery Works, is 9,640 tons, valued at ₹12,508. Production of brick clay at Muzaffarpur is at about 55,930 tons, valued at about ₹5,243. The estimated production of clay at Balasore is 70 tons.

It may, however, be remarked that it seems likely that the brick-making in the neighbourhood of Calcutta, on the banks of the Hooghly, is the most important industry of this nature in India. It is to be regretted, therefore, that no statistics have been furnished. The river water is allowed to overflow into specially prepared basins and a deposit of fine clay collected. From this material a very large percentage of the house of Calcutta have for some years past been constructed. The bricks are for the most part fired in furnaces, not in kilns. The consumption of coal for the brick fields of Calcutta must be no small item in the annual demands of that mineral.

North-West Provinces.—The following places in the North-West Provinces and Oudh are particularly noted for their fine clay suited for pottery:—Aligarh, Muttra, Amroha in Moradabad, Chunar, Azamgarh, Lucknow, and Rampur State. Clays of various kinds are also to be found in the Bundelkhand and Baghelkhand States of the Central India Agency.

Panjab.—The pottery factory, which was started last year at Harnpur in the Jhelum district of the Panjab, is no longer in existence. The pottery of Multan and Delhi are famous. The last mentioned are not however constructed of clay but from a powder artificially prepared from certain rocks.

Madras.—There are several works in the Madras Presidency, almost all belonging to Europeans, for manufacturing bricks, tiles, cements, etc. Near Rajahmundry in the Godavari district, *kaolin* is reported to exist, of which goglets, some of superior type, are made, but not on a large scale. A small consignment of this clay has, it is said, been exported to England for experimental purposes. A sort of pale clay is reported to be available in Vizgenagram and to be used for making pots at the local School of Arts. The clay has been identified to be *kaolin* by Mr. Middlemiss, Superintendent, Geological Survey of India. Fine plastic clay, used for making figures, is reported to be found in Cuddalore taluq of South Arcot district. The production of this presidency was last year stated to be 331,624 tons. Pottery clay also occurs in Mercara in Coorg, where tiles and bricks are manufactured by the Mercara Pottery Works. The production of 1895 has been given as 1,832 tons. Pottery clay is also reported to be available in large quantities on paddy lands in Changanacherry in Travancore. It is stated that clay used for making bricks, tiles, and pottery is met with in parts of Pudukottai.

Central Provinces.—The most famous clay of these provinces is that of Hoshangabad especially near Sohagpur. In 1895 it is estimated that the amount utilized in the manufacture of *surais* and other earthen vessels came to 73 tons.

Rajputana and Central India.—In addition to the particulars recorded above under fuller's-earth, it may be said that Meywar reports chalk and other kinds of clay for brick, fine pottery and building purposes in many places within the State. Good brick clay also occurs. In Ajmír-Merwara the quantity of clay produced has been returned as (1894) 22,832 tons, valued at ₹2,238, and (1895) 23,910 tons, valued at ₹2,350. In Rewah, it is said 14 mines for clay exist, the produce of which was valued at ₹1,500. The three mines in Kothi realized ₹1,000. In Sohawal the contract rate for two mines was ₹590 and Nagoda produced 80 maunds, valued at ₹25.

Berar.—The production of clay in this province during 1895 was stated to have been 420 tons, valued at ₹210.

Mysore.—The following statement has been furnished for Mysore:—

	Estimated Quantity.	Value.
	Cwt.	₹
Bangalore	1,096,52›	62,850
Kolar	383,960	47,995
Tumkur	82,710	2,691
Mysore	2,293,‹80	14,335
Assam	121,420	7,589
Simoga	50,720	755
Kadur	239,600	34,115
Chitaldrug	314,600	12,365
TOTAL	4,582,710	1,82,695

Burma.—HANTHAWADDY.—The estimated production during 1895 was 65,972 tons, valued at ₹65,972. PEGU.—The estimated production in 1895 was 2,132 tons, valued at ₹2,650. THARRAWADDY.—The estimated production, 1895, was 26,375 tons, valued at ₹36,925. PROME.—The estimated production during the year was 4,803 tons, valued at ₹4,803. PAKOKKU.—The production in 1895 was 390 tons, valued at ₹2,340. The price fell during the year owing to less demand. MINBU.—The production in 1895 was 3,569 tons, valued at ₹2,125. The Deputy Commissioner reports that no explanation can be given for the variation in the rates as compared with the previous year. The figures were supplied by the Executive Engineer and Sub-Divisional Officer. MAGWE.—The production in 1895 was 3,894 tons, valued at ₹7,407. Fall in price due to less demand. MYINGYAN.—The estimated production in 1895 was 16,770 tons, valued at ₹1,873. Rise in price due to greater demand for bricks.

170. ***OUTTURN.***—Statistics of outturn during 1895 were available for the following provinces only:—

	Value.	Quantity.
	₹	Tons.
Madras	Not stated.	331,624
Bengal	Ditto	66,276*
Burma	1,24,095	108,812
Coorg	Not stated.	1,832
Rajputana	15,810†	39,992
Ajmere-Merwara	2,350	23,910
Mysore	1,82,695	229,135
Central Provinces	Not stated.	73‡
Berar	210	420
	Tons	802,074

* Returns from the Burdwan, Muzaffarpur and Balasore districts.
† Outturns of Jeysalmir and Bikanir States.
‡ „ „ Hosangabad district.

CLAY. There are in India some 9 pottery works and 27 tile and cement manufactories. The former give employment to something like 1,460 persons, and the published returns of their manufactures were last year ₹2,20,574, by far the major portion being the Raniganj Pottery Works. The tile and cement works give employment to 4,462 persons of whom 2,597 are permanently employed and they turn out goods which last year were valued at ₹5,91,000.

GRANITE.

XXXII.—GRANITE (*Bhurbhurá patthar, Hind.*).

171. ***OCCURRENCE.***—In these returns the term granite is employed for all massive crystalline rocks, such as granite proper, gneiss, etc. Rocks of that nature occur plentifully in Western Bengal, in the Madras Presidency, and in the Central Himálaya. Granite appears to be used exclusively for local purposes. It is less employed than formerly, when it was a favourite stone for monolithic structures. The demand for this stone has, however, increased in the Ganjam and Vizagapatam districts of the Madras Presidency since the East Coast Railway works were opened. Quarrying is briskly carried on all over the district of Cuddapah, where the stone is found in layers at some depth from the surface. It is cut into slabs of required sizes by means of chisels. Granite is also found in many parts of Cochin and Banganapalle, and in all hilly localities of Travancore, and in some parts of Pudukkottai.

The following paragraphs have been specially furnished in connection with the returns for 1895 :—

Bengal.—The extent of the occurrence or production of granite cannot be exactly estimated. The stone exported in 1895 by rail in the Gaya district amounted to 7,472 tons, worth ₹11,642. At present the industry is slack. The estimated production in the Sonthal Parganas is 40,658 tons. In Manbhum the estimated production of rubble stone is 270 tons, valued at ₹24 ; and of quartz stone, 7,526 tons, valued at ₹685.

North-West Provinces and Oudh.—Granite occurs in Banda, Hamirpur, Jhansi, Mirzapur and Kumaon. The quantity quarried in 1895 has been reported at 5,732 tons.

Central Provinces.—Granite of good quality occurs in many localities especially in the Jabalpur and Hoshangabad districts. It is dug out by blasting, then broken into small pieces and used for metalling the roads but occasionally for building purposes. A royalty is realized of 6 annas per 100 cubic feet.

Rajputana.—Jaipore, Kishengarh, Tonk, Kerowlee, have nothing further to report than formerly. Bhurtpur believes its previous returns were grossly incorrect.

Coorg.—Granite used for metalling the roads and building purposes.

Burma.—PROME.—Occurs in the Shwedaung sub-division and is extracted by the Public Works Department for metalling roads. The production during the year was 603 tons, valued at ₹1,193, TOUNGOO.—The production in 1895 was 3,309 tons, valued at ₹4,251, which is the value at the mouth of the pit, whereas the value in 1894 included cost of carriage and other charges. MINBU.—Produced in the Salin river and in the Sabwet chaung, in Salin and Minbu townships, is used by the Public Works Department for metalling roads. The production during the year was 495 tons, valued at ₹511.

172. ***OUTTURN.***—The following statement compiled from the returns may be given as the production during 1895 :—

	Quantity. Tons.	Value. ₹
Bengal	55,926*	Not stated.
North-West Provinces and Oudh	5,732	Ditto.
Central Provinces	364†	Ditto.
Berar	162,349	3,812
Central India	Not stated.	Not stated.
Rajputana	9,528‡	4,823
Ajmír-Merwara	35,050	7,000
Madras	667,435	Not stated.
Bombay	Not stated.	Not stated.
Mysore	223,704	4,49,200
Coorg	5,568	16,704
Burma	4,407	5,955
Tons	1,170,063	

XXXIII.—LATERITE.

LATERITE. 173. ***OCCURRENCE.***—Laterite occupies an important position in the superficial geology of India, and is widely distributed throughout the Peninsula.

Bengal.—The estimated production of laterite in Midnapore was 28,454 tons, valued at ₹625. The estimated production in Monghyr is 8,695 tons. For Cuttack the production came to 7,202 tons, valued at ₹8,142. It has been largely used in canal works as well as for building purposes and metalling roads. The estimated production of laterite in Balasore was 2,531 tons.

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* Outturns of Gaya, Sonthal Parganas and Manbhum.
† „ Hoshangabad district.
‡ „ Tonk and Kerowlee States.

Central Provinces.—Is abundant in these provinces as, for example, in Jabalpur and Hoshangabad. It is excavated by manual labour and is used for metalling roads. A royalty of one anna per 100 cubic feet is realized.

Rajputana.—The outturn in Bikanír was last year 92,885 tons, valued at ₹44,503.

Burma.—HANTHAWADDY.—The estimated production in 1895 was 27,058 tons, valued at ₹37,693. The variations in the value are due to the different rates at which laterite is valued in different parts of the district. PEGU.—The estimated production in 1895 was 537 tons, valued at ₹1,157. The decrease in the outturn is due to the transfer of the Kyauktan sub-division (from which most of the laterite is obtained) to Hanthawaddy, and the decrease in value to the rate being calculated exclusive by royalty and cart-hire. THARRAWADDY.—The estimated production in 1895 was 1,942 tons, valued at ₹4,462. PROME.—The estimated production in 1895 was 2,477 tons, valued at ₹4,857. PAKOKKU.—Estimated outturn in 1895 was 946 tons, valued at ₹1,892. MINBU.—The production during the year was 136 tons, valued at ₹225. MAGWE.—The production in 1895 was 4,786 tons, valued at ₹5,351. Fall in price due to less demand.

174. ***OUTTURN.***—The estimated total production in 1895, available for the following provinces only:—

	Quantity. Tons.	Value. ₹
Madras	5,194,550	Not stated.
Bengal	47,882*	Not complete.
Burma	37,882	55,677
Coorg	128	128
Mysore	231,952	183,884
Rajputana . . .	92,885	44,503
Berar	680	340
Central Provinces . .	625†	Not stated.
Tons	5,588,584	

XXXIV.—LIMESTONE (*Chúná, phúnkne-ka kankar, Hind.*).

175. ***OCCURRENCE.***—Marble (*marmar*), dolomite, serpentine, *kankar*, etc., one or other can hardly be said to be absent from any of the Indian geological formations. They occur in almost all the districts of Madras Presidency. In the Manbhum, Singhbhum, Lohardaga, and several other districts of Bengal. In the Khasi and Jaintia Hills, Assam. In the Sambalpur, Raipur, Jabalpur, Nagpur, and Wardha districts of the Central Provinces. They are frequent in the Bombay Presidency and Sind, particularly Kathiawar. Excellent limestone is also met with in Burma, Mysore, Hyderabad, and Baroda.

The best limestone and marble is probably that met with in the northern part of the Jabalpur district. But good limestone also occurs in the Vindhyan range, in the following Native States of the Central India Agency:—Bundelkhand, Baghelkhand, and Bhopawar; and in several of the Native States of Rajputana, Makrana being the chief. Within a radius of eight miles around Makrana there are something like one hundred quarries. But of these only some fifteen are at present worked.

The Makrana quarries vary in depth from 30 to 75 feet, and follow the lead of the vein. The marble is excavated by blasting, and is then cut into the required sizes by means of steel saws. It is hauled to the surface on wooden rollers by manual labour, the chips and dust are burnt into chunam, and used for the finer kinds of plastering. The quality of the stone is generally better according to the depth it is worked out, but, owing to the rude appliances used for hoisting it to the surface, it is impossible to work to any great depth. The rates levied by the Marwar Darbar are as follows:—

₹1 per maund up to 10 maunds, and 4 annas per additional 2½ maunds.
₹2 per maund on all articles such as cups and plates cut from the stone.
₹2 per cart-load on coloured marble which is inferior to the white stone.

The revenue derived from the quarries is credited to His Highness's privy purse. From statistics it would appear that the output is declining, which may be accounted for by bad seasons and the demand having lessened owing to the marble quarries started in the Jaipur State. The railway which has been opened through Makrana will, however, certainly give an impetus to further excavation, unless the opinion that the quarries are nearly worked out, expressed by Mr. Foote, the Geological Superintendent of the Baroda State, be found correct.

The limestones of the Bombay Presidency and Sind, particularly that from Jhalavad Prant and the south-west coast of Kathiawar, are admirably suited for building purposes. The Porbundar miliolite and the grey sandstone of Dhangadra are perhaps the best known. The former has recently been conveyed all the way from Kathiawar to be used in the construction of buildings in Calcutta.

176. ***QUARRIES.—MADRAS.***—The limestones of this Presidency are, for the most part, collected from the surface; occasionally they are dug out of the earth. In Bengal, some of the quarries are worked

* Does not include gravel.
† From Hoshangabad district only.

LIMESTONE. with pick-axes and blasting, while in others the stone is excavated by hand labour, or dragged up from the beds of rivers. The production of the Sonthal Parganas in 1895 was 7,000 tons; Cuttack, 35 tons; and Balasore, 2,411 tons.

Central Provinces.—Limestone is quarried at Jabalpur by means of blasting; it is then burnt in lime kilns. In Hoshangabad limestone occurs all over the district: the production last year was estimated at 304 tons.

Central India.—The production at Panna was last year 413·92 tons, valued at ₹794. In Rewah one quarry in Pargana Madhogarh worked by Sutna Stone and Lime Company, Limited, who paid ₹721 on 312,397 cubic feet of limestone despatched during the half-year ending 30th June 1895. The quantity produced at Nagode was 549 tons, valued at ₹1,500. Limestone occurs in Bag, Ali Rajpur and Jhabua (Bhopawar).

Rajputana.—In addition to the particulars published in former reports as to the limestone of Jaipur, Kishengarh and Jeysalmír, it may be remarked that the stone from Jajiá is similar to Dabhla stone. Quarries are 7 *kos* distant from Jeysalmír. Used for the tops of *chatree* and domes of temples. The production in 1895 was 2,770 tons and value ₹2,536. Sirohi.—3,352 tons found in the vicinity of Morthala siding. Quantity at other places cannot be ascertained on account of contract system. Marwar.—Total production of marble stone during 1895 was 358½ tons.

Baroda.—The quantity and value of the limestone found in Sangir quarry in Sankheda taluqa was last year 1,600 tons, valued at ₹100.

Burma.—MYAUNGMYA.—The outturn of burnt lime during the year was 4,089 tons, valued at ₹16,070. BHAMO.—Found in both first and second defiles in large quantities. The extent of occurrence is practically unlimited in quantity, the whole of the defiles being composed of rock, much of which is limestone. In the second defile lime is made from limestone and sold chiefly to the railway. The limestone in the first defile is broken up and used for road-metalling. The industry is reported to be improving. The production in 1895 was 3,000 tons, valued at ₹4,000. SHWEBO.—The outturn in 1895 was estimated at 1,000 tons, valued at ₹750. SAGAING.—The estimated production in 1895 was 1,696 tons, valued at ₹1,696. PAKOKKU.—Limestone exists in the Salè, Seingan, Myaing, Myotha, Chaungsôngyi, and Chauktaung circles of the Myaing township and is quarried from Kyibingôn and Tanwegan villages. The outturn per kiln is about 200 baskets a month in the dry weather and 100 baskets a month in the rains. The kiln consists of a pit 9 feet deep, with a diameter of 6 feet at the base and 4½ feet at the mouth, and at a height of 3 feet from the bottom; a ridge 6 inches wide and gradually decreasing upwards encircles the pit. At a distance of 10½ feet from the mouth of the pit a hollow passage, 6 feet in diameter, is tunnelled to the bottom of the pit where it meets a firehole 1½ feet in diameter. The limestone is quarried in the above mentioned localities and conveyed to the kiln in carts. One cart makes two trips a day to the kiln: once in the morning and once in the evening. A cart-load is estimated at 5 basketfuls. At the end of five days, or when 10 cart-loads have been brought to the kiln, the stone is broken up into conveniently-sized lumps and arranged one over the other, on the inner ridge, arch-ways towards the mouth of the pit, which is surrounded with a stone parapet about 3 feet high. Firewood is then taken down the tunnel and placed in the bottom of the pit through the fire-hole and a fire kindled under the limestone. This is kept burning for two or three days and when the kiln is cool the burnt stone is raked up through the tunnel and 50 or 60 pots of water are emptied on the burnt stones. The water causes the stones to crack and crumble into powder, and this powder is lime. The annual outturn from both Kyibingôn and Tanwegan is only 2,500 baskets and 50 baskets of lime respectively; the outturn of one kiln sells for ₹17 to ₹18. MINBU.—The production during the year was 1 ton, valued at ₹15. MAGWE.—The production during the year was 958 tons, valued at ₹3,308. Fall in price due to less demand. THAYETMYO.—The outturn in 1895 was 1,050 tons, valued at ₹420. It is reported that the value given in 1894 cannot have been correct as the real value was the same as in 1895. MYINGYAN.—The outturn in 1895 was the same as in 1894, namely, 81 tons, valued at ₹700.

Assam.—There are two centres of production Lakhimpur and the Khasi and Jaintia Hills. The former yielded last year 1,666 tons and the latter 60,880 tons. The following notes have been furnished regarding these Assam limestones:—

LAKHIMPUR.—The Doms near Sadiya are the only people who collect stones. They go in boats for the purpose of fishing and collecting limestone for themselves and for Marwari merchants. They return as soon as their boats are fully loaded. They do not reduce the stones to lime, but sell them at Sadiya. Although the quantity of lime collected has not increased during the year, the present state of the industry (if the small operations dealt with deserve this name) is reported to be prosperous. As a matter of fact, however, the local supply cannot compete with that obtained from the Khasi and Jaintia Hills.

KHASI AND JAINTIA HILLS.—Some of the quarries are worked under leases issued by Government for various periods, and some under permits issued annually by Government to applicants for quarrying and removing limestone. In some quarries, the limestone is detached by blasting with dynamite and gunpowder and the boulders are then split and broken with Native crowbars and hammers, while in others no dynamite is used, the limestone being workable without blasting. The present state of the industry is dull, as both the outturn and price have fallen considerably. During 1895, no big traders came to purchase and remove limestone from the quarries. Messrs. Inglis & Co., who have a monopoly of the limestone business at Shella, did not purchase much limestone during 1895, as they had already in stock 3 to 4 lakhs of maunds of limestone unsold at Chhatak.

It may be remarked that to a very large extent the quarries here dealt with meet the demands of Calcutta for lime.

MANIPUR.—The lime quarries of the State meet all the local demands.

177. ***Kankar.***—Limestone in the nodular form known as *kankar* occurs in Bengal and almost all over the North-West Provinces, and is very largely used for making lime and metalling roads. There are fifteen *kankar* quarries in the Muzaffarpur district of Bengal, of which the most important are at Chandrutti, Kudaria, Harawli, and in the bed of the Khanow and Gundak rivers. The outturn in 1895 was estimated at 13,036 tons, valued at about ₹8,962. In Monghyr the outturn was 2,416 tons and in Manbhum, 55,634 tons, valued at ₹630.

It is also met with in the Gwalior, Baghelkhand, Bag, Ali Rajpur, and Jhabua States of the Central India Agency. The outturn in 1894 was estimated for the Gwalior States at 1,420 tons, value ₹13,616. Returns for 1895 show a valuation of ₹4,395. In Bhurtpur (Rajputana), this form of lime is regularly collected but no returns of the amount have been furnished.

178. ***OUTTURN.***—The estimated production during 1895 was :—

	Quantity. Tons.	Value. ₹
Madras	651,661	Not stated.
Bengal	82,532	9,898*
Burma	11,875†	26,959†
Assam	62,788	69,857
Mysore	75,927	157,144
Rajputana	190,756	179,412
Central India	963‡	3,055‡
Ajmír-Merwara	9,964	1,295
Baroda	1,600	100
Berar	1,414	1,267
Central Provinces	304§	Not given.
Tons	1,089,784	

XXXV.—SANDSTONE (*Ret-patthar, Hind.*).

179. ***OCCURRENCE.***—Several of the recognised formations in India, *viz.*, the Vindhyan and Gondwana, cretaceous and tertiary, afford sandstones admirably suited for building, and some of them have from very early times been largely drawn upon for the supply of materials for that purpose. The Vindhyan formation stands pre-eminen t, its stones having been used for many centuries in the construction of the forts, palaces, and sacred edifices of Delhi, Agra, and Northern India. Sandstone is obtainable in the Ganjam, Vizagapatam, Godavari, Anantapur, Kistna, North Arcot, South Arcot, and Tinnevelly districts of the Madras Presidency; in the Nimar, Chhindwara, Jabalpur, and Saugor districts of the Central Provinces; and in the Agra, Muttra, Jhansi, Hamirpur, Banda, Allahabad, Mirzapur Dehra Dun, Kumaon, Sultanpur and Garhwal districts of the North-West Provinces. Chunar in the Mirzapur district is particularly famous for its fine sandstone. Sandstone is found in the Manbhum Shahabad, Monghyr and Cuttack districts of Bengal, in the Baghelkhand and Bhopawar States of the Central India Agency, and in the several States of Rajputana, of which the Tonda hills in Kishengarh produce beautiful quartz crystals, but there is no trade in them. All the hills in Kishengarh belong to the transition series, and supply sandstone for building purposes. Very large and durable slabs and beams are found in certain quarries near the town of Kishengarh. These slabs are greatly prized for roofing purposes and there is a large trade in them. The quarries are worked by a class of Brahmins called Neharaj or Mohobrahmans.

Sandstone is also found in the Shwebo and Myingyan districts of Upper Burma and in the Hyderabad State. In Bengal, sandstone is worked by quarrying; the present state of the industry is said to be normal.

The following notes may be given from the provincial reports of 1895 :—

Bengal.—The estimated production in Monghyr is 34,431 tons. The estimated production in the Sonthal Parganas is 30,000 tons. In Manbhum the estimated production of sandstone is 781 tons, valued at ₹72. In Cuttack the yield was 14,333 tons, valued at ₹5,223.

North-Western Provinces and Oudh.—Sandstones are found in Agra, Muttra, Jhansi, Hamirpur, Banda, Allahabad, Mirzapur, Dehra Dun, Kumaon and Garhwal. Chunar in the Mirzapur district is particularly famous for its fine sandstone. The quantity worked in 1895 is estimated at 164,616 tons.

Central Provinces.—It is plentiful in Jabalpur district. The stone is extracted by means of blasting and is then dressed. Undressed stones are used in the foundations of buildings. A mine in the Jabalpur tashil has been leased. Sandstone occurs all over Hoshangabad, the production last year having been 2,087 tons.

* Value given for only 68,705 tons.
† Figures for Pakôkku not given.
‡ Quantity and value of Panna and Nagode given as well as value only from Indore.
§ Figures for Hoshangabad district only.

SANDSTONE. ***Baroda.***—The quantity and value of the sandstone found in Songir hills in Sankheda taluqa was last year 1,200 tons, valued at ₹3,600.

Rajputana.—Further than giving the production for the year 1895 no additional information has been furnished as to the sandstones of Jaipur, Kishengarh, Jeysalmír, Marwar, Ulwar, Kotah, Jhallawar, Bikanír, Kerowlee and Dholepur. But of Bhurtpur it is said that the production was 8,000 tons, valued at ₹9,000. "There is an inexhaustible supply of laminated sandstone. The stone is red; white and speckled. It is quarried in massive slabs, which can be split to any required size. The value shown corresponds to the royalty and duty received by the State for stone quarried and sold; it does not include the cost of quarrying, carrying, etc., and stone quarried free for State use has not been valued.

Madras.—Available in large quantities in ten villages over an area of 30 square miles in the Sivaganga zemindari of Madura.

Burma.—SHWEBO.—The production in 1895 was 2,600 tons, valued at ₹2,437.

MYINGYAN.—The estimated outturn during the year was 20 tons, valued at ₹20.

180. ***OUTTURN.***—The estimated production in 1895 was:—

	Quantity. Tons.	Value. ₹
Madras	324,391	Not stated.
Bengal	79,544*	Not complete.
North-West Provinces and Oudh	164,616	Not stated.
Central Provinces	2,087	Ditto.
Burma	2,620	2,457
Ajmír-Merwara	28,198	14,305
Mysore	26,000	13,000
Rajputana	189,681	130,694
Central India	445†	Not stated.
Baroda	1,200	3,600
Tons	818,782	

XXXVI.—GRAVEL and RUBBLE.

GRAVEL. 181. In one or two of the provincial returns the production of gravel is quoted for the most part along with laterite, other instances under sandstone or trap. It is thus impossible to be sure of the accuracy in separating these, and it would seem desirable that in future returns gravel and rubble should be given independently of the nature of the rocks from which they may have been derived. Roughly speaking, gravel and rubble are naturally formed metalling stones mixed with sand.

Of Bengal it was stated that the production of gravel in 1895 came to 10,790 tons, valued at ₹5,430. So again under sandstone Bengal returns 28,100 tons of rubble, valued at ₹12,105.

Burma furnishes the following particulars of gravel:—PAKOKKU.—Gravel, including stone for metalling, is obtained from a low range of hills about 1 mile to the north of Pakôkku town. The quarries are scattered among the hills to about 2 miles north-west of the town. The gravel is excavated and placed in carts as it is required and the supply is unlimited. The cost of excavating is about ₹1 per ton. Very little of this metalling material is used and the industry is not flourishing.

XXXVII.—SLABSTONE.

SLABSTONE. 182. ***OCCURRENCE.***—Is met with in the Nizám's Dominions. The estimated production for 1894 is valued at ₹3,950 and in 1895 ₹2,870; the quantity cannot be given as the working of the quarries is on contract.

XXXVIII.—SLATE (*Shail, Hind.*).

SLATE. 183. ***OCCURRENCE.***—Slate occurs in the Cuddapah, Kistna, and Kurnool districts of the Madras Presidency. Samples of slate are found near the villages of Mohari and Belgoa in the Saugor district of the Central Provinces in the vicinity of the Cawnpore road. In the Bagalkote taluq of Bijapur a hard rock occurs which is prized as a building stone. Slate is also found in Jamalpur and Dhararah hills near Monghyr and in the Kymore hills in Shahabad (Bengal); in the Banda, Jhansi, Dera Dun, Kumaon and Garhwal districts of the North-West Provinces; in the Simla and the Kangra districts of the Panjab; and in the Jaipur, Ulwar, and Dholepur States of Rajputana. Metamorphic black slate is stated to occur in the Nemkhara Bhumiat in the Bhopawar States of the Central India Agency.

The stone is used for buildings, flagging and other masonry structures, but not extensively, as it cannot be easily split into thin slabs.

The following passages may be given from the provincial returns of 1895:—

—The estimated production in Monghyr is 38,880 tons.

* Does not include rubble.
† Calculated on the ratio of last year's production.

SLATE.

Central Provinces.—A quarry exists near the village of Kuan in Jabalpur district, but has not as yet been regularly worked.

Rajputana.—Quarries exist in Jaipur, Ulwar, Bundi, Tonk and Dholepur.

Central India.—Metamorphic black slate occurs in Nemkhera, Bhopawar State.

185. ***OUTTURN.***—The estimated production in 1895 has been furnished for the following :—

	Quantity. Tons.	Value. ₹
Madras	5,635	Not stated.
Bengal	38,880	Ditto.
Mysore	36	20
Rajputana	14,664	14,356
Tons	59,215	

XXXIX.—TRAP.

TRAP.

186. ***OCCURRENCE.***—This section has been made to include basalt and other massive compact crystalline black or dark-coloured rocks, and occurs chiefly in the Bombay Presidency, Western Bengal, and the Central Provinces, where samples of trap are found all over the Saugor and Mandla districts. The mines at Jamalpur and Dhararah hills in Bengal are worked by Messrs. Stevens, Ambler & Co. It is also found in the Godavari, Kistna, and Trichinopoly districts of the Madras Presidency, and in the north and south-western parts of His Highness the Nizám's Dominions. In Jhabua territory, Bhopawar, Central India Agency, trapstone is said to be used for building purposes, but returns of production are not given.

The following passages may be quoted from the provincial returns for 1895 :—

Bengal.—In the Sonthal Parganas the estimated outturn of trap is 3,679 tons. The estimated production in Manbhum is 1,223 tons, valued at ₹50.

Madras.—Found in one village in the Kalla Kurchi taluq, South Arcot district, but not used for any purposes.

Mysore and Coorg.—Used for metalling roads.

Rajputana.—BHURTPUR.—A kind of trap is used as a building stone, but the value *in situ* is inappreciable.

Central India.—Trap is found in many parts of this Agency. There is excellent building stone at Burwani, and at Dhar there is a good red building stone.

187. ***OUTTURN.***—The outturn during 1895 is available for the following provinces only :—

	Quantity. Tons.	Value. ₹
Madras	7,301	Not stated.
Bengal	4,902	50*
Berar	16,348†	...
Mysore	30	235
Tons	28,581	

XL.—OTHER KINDS.

OTHER KINDS.

188. ***OCCURRENCE.***—The returns furnished under this heading include what are designated as jungle and rough stone, blue stone, and white stone, etc. The estimated production during 1895 was as follows :—

	Quantity. Tons.	Value. ₹
Madras	59,424	Not stated.
Berar	4,444	1,850
Central India	42,140	6,589
Rajputana	81,655	44,865
Mysore	12,531	13,315
Tons	200,194	

* Value of 1,223 tons.
† Estimate for Akola, Amraoti and Ellichpur districts only.

STATEMENT No. I.

Showing the Production of the Minerals (Salt, Coal, Iron, and Petroleum) for which Statistics are available for the Calendar year of 1895.

SALT.

STATEMENT No. I.

Showing the Production of Minerals for which Statistics are available for the Calendar year 1895.

SALT.

PROVINCE.	1895.		1894.		Average of the three years 1892 to 1894.		Percentage on weight of increase or decrease in 1895, compared with	
	Weight in tons.	Value.	Weight in tons.	Value.	Weight in tons.	Value.	1894.	Average of 1892 to 1894.
		£		£		£		
British Provinces.								
Madras . . .	266,222	*15,55,211*	326,501	*19,25,847*	311,733	*18,57,460*	—18·46	—14·60
Bombay including Sind .	419,417	*15,41,046*	438,229*	*18,39,741*	362,257	*13,53,859*	—4·29	+15·78
Bengal . . .	7,663	*56,204*	8,759	*63,419*	4,705	*35,923*	—12·51	+62·87
North-West Provinces and Oudh.	1,344	*13,775*	1,113	*11,411*	1,207	*12,338*	+20·75	+11·35
Panjab	105,688	*4,98,243*	104,939	*4,30,334*	103,342	*4,45,565*	+0·71	+2·27
Central Provinces . .	...	...	...	...	...	...	...	...
Assam	...	...	...	...	...	...	...	...
Burma	19,245	*7,73,592*	17,516	*6,97,042*	14,235	*6,48,325*	+9·87	+35·19
Aden	29,554	*1,74,188*	56,175	*3,33,847*	46,451	*2,75,688*	—47·39	—36·38
Total . .	849,133	*46,12,259*	953,232	*53,01,641*	843,930	*46,29,158*	—10·92	+0·62
Native States.								
Mysore	...	...	...	...	...	...	...	...
Kashmir . . .	No returns	*40*	2	*33*	1	*44*	...	...
Baluchistan . . .	...	...	...	...	...	...	...	...
Central India Agency† .	694	*Not stated*	614	*Not stated*	636	*Not stated*	+13·03	+9·12
Rajputana States . .	248,723	*14,60,051*	339,350	*25,88,447*	162,417	*11,20,325*	—26·71	+53·14
Cutch and Kathiawar .	4,580	*53,592*	4,180	*41,508*	4,450	*40,214*	+9·57	+2·92
Nizám's Dominions .	...	...	...	...	...	...	...	...
Total .	253,997	*15,13,643*	344,146	*26,29,988*	167,504	*11,60,583*	—26·19	+51·64
TOTAL BRITISH PROVINCES AND NATIVE STATES.	1,103,130	***61,25,902***	1,297,378	***79,31,629***	1,011,434	***57,89,741***	—14·97	+9·07

* The returns of Cutch and Kathiawar have been isolated from the provincial figures.
† Relates to Gwalior.

STATEMENT No. I.

Showing the Production of Minerals for which Statistics are available for the Calendar year 1895.

COAL.

PROVINCE.	1895.		1894.		Average of the three years 1892 to 1894.		Percentage on weight of increase or decrease in 1895, compared with	
	Weight in tons.	Value.	Weight in tons.	Value.	Weight in tons.	Value.	1894.	Average of 1892 to 1894.
		₹		₹		₹		
British Provinces.								
Madras . . .	1,737	8,685	1,337	8,022	633	3,612	+29·92	+174·40
Bombay including Sind	...	...	...	...	...	...	...	...
Bengal . . .	3,550,069	1,02,42,689	2,035,934	62,79,378	1,952,950	54,15,474	+74·37	+81·78
North-West Provinces and Oudh.	...	...	...	...	...	...	...	...
Panjab . . .	72,493	5,86,275	66,467	5,24,988	70,038	5,58,388	+9·07	+3·51
Central Provinces .	122,776	6,39,536	140,495	6,39,058	135,872	6,48,012	−12·61	−9·64
Assam . . .	172,717	12,08,375	169,448	11,85,954	165,973	11,61,582	+1·93	+4·06
Burma . . .	17,289	95,089	12,111	1,08,999	8,573	72,545	+42·75	+101·67
Total .	3,937,081	1,27,80,649	2,425,792	87,46,399	2,334,039	78,59,613	+62·30	+68·61
Native States.								
Mysore . . .	...	...	...	...	...	...	...	...
Kashmir . . .	...	...	...	...	...	...	...	...
Baluchistan . .	23,259	3,08,288	21,498	2,68,892	18,292	2,25,385	+8·19	+27·15
Central India Agency	118,479	4,06,697	132,837	4,53,255	105,269	3,74,140	−10·81	+12·55
Rajputana States .	...	...	...	...	...	...	...	...
Nizám's Dominions .	292,915	10,25,202	240,525	8,41,837	182,516	6,38,804	+21·78	+60·49
Total .	434,653	17,40,187	394,860	15,63,984	306,077	12,38,329	+10·08	+41·55
TOTAL BRITISH PROVINCES AND NATIVE STATES.	4,371,734	**1,45,20,836**	2,820,652	**1,03,10,383**	2,640,116	**90,97,942**	+54·99	+65·59

STATEMENT No. I.

Showing the Production of Minerals for which Statistics are available for the Calendar year 1895.

IRON ORES.

PROVINCE.	1895.		1894.		Average of the three years 1892 to 1894.		Percentage on weight of increase or decrease in 1895, compared with	
	Weight in tons.	Value.	Weight in tons.	Value.	Weight in tons.	Value.	1894.	Average of three years 1892 to 1894.
British Provinces.		R		R		R		
Madras	2,828	*1,930*	2,999	*2,002*	1,315	*1,769*	—6·05	+115·06
Bombay including Sind .	...	...	...	...	...	...	...	...
Bengal	32,207	*97,091*	24,759	*80,696*	24,725	*74,037*	+30·08	+30·26
North-West Provinces and Oudh.	...	...	...	...	...	...	...	...
Panjab	31	*378*	20	*102*	16	*77*	+55·00	+93·75
Central Provinces . .	5,910	*15,697*	6,181	*13,753*	3,467	*9,801*	—4·38	+70·46
Assam	...	...	...	...	...	...	...	...
Burma	...	...	...	...	...	...	...	...
Total .	40,976	*1,15,096*	33,959	*96,553*	29,523	*85,684*	+20·66	+38·79
Native States.								
Mysore	1,335	*10,947*	972	*7,871*	669	*9,817*	+37·35	+99·55
Kashmir	...	*80*	...	...	...	...	...	...
Baluchistan . . .	...	...	...	...	...	...	...	...
Central India Agency . .	2,653	*1,02,646*	2,685*	**1,01,424*	2,109	*1,16,425*	−1·19	+25·79
Rajputana States . . .	855	*47,572*	774	*41,735*	580	*32,768*	+10·47	+47·41
Nizám's Dominions . .	... †	*2,103*	No returns	2,813	...	*3,423*	...	...
Total .	4,843	*1,63,348*	4,431‡	1,53,843	3,358	*1,62,433*	+9·30	+44·22
TOTAL BRITISH PROVINCES AND NATIVE STATES.	45,819	***2,78,444***	38,390‡	***2,50,396***	32,881	***2,48,117***	+19·35	+39·35

* Relates to Gwalior (production in 1894, 801 tons, valued at R6,889), Bundelkhand, Baghelkhand, Bhopawar and Goona.
† Quantities cannot be given as the mines are given out on contract.
‡ Incomplete because of no returns of production in Nizám's Dominions.

STATEMENT No. I.

Showing the Production of Minerals for which Statistics are available for the Calendar year 1895.

PETROLEUM.

PROVINCE.	1895.		1894.		Average of the three years 1892 to 1894.		Percentage on quantity of increase or decrease in 1895, compared with	
	Quantity in gallons.	Value.	Quantity in gallons.	Value.	Weight in gallons.	Value.	1894.	Average of three years 1892 to 1894.
British Provinces.		₹		₹		₹		
Madras	...	...	...	...	...	...	...	...
Bombay including Sind .	...	...	...	...	...	...	...	...
Bengal	...	...	...	...	...	...	...	...
North-West Provinces and Oudh.	...	...	...	...	...	...	...	...
Panjab	1,560	*353*	1,742	*409*	1,933	*441*	—10·45	—19·30
Central Provinces . .	...	...	...	...	...	...	...	...
Assam	(*c*) 36,435	(*d*) *7,287*	166,904	*33,380*	90,132	*17,060*	—78·17	—59·58
Burma	(*a*) 12,975,995	(*b*) *15,34,951*	10,920,951	*10,57,545*	9,965,197	*7,37,478*	+18·82	+30·21
Total .	13,013,990	*15,42,591*	11,089,597	*10,91,334*	10,057,262	*7,54,979*	+17·35	29·40
Native States.								
Mysore	...	...	...	...	...	...	...	...
Kashmir	...	...	...	...	...	...	...	...
Baluchistan . . .	...	...	50,000	*9,375*	17,650	*3,210*	...	...
Central India Agency .	...	...	...	...	...	...	...	...
Rajputana States . .	...	...	...	...	...	...	...	...
Nizám's Dominions . .	...	...	...	...	...	...	...	...
Total .	...	...	50,000	*9,375*	17,650	*3,210*	...	...
TOTAL BRITISH PROVINCES AND NATIVE STATES.	13,013,990	***15,42,591***	11,139,597	***11,00,709***	10,074,912	***7,58,189***	+16·83	+29·17

(*a*) Increase in outturn due to extended operation.
(*b*) Increase in value due partly to extended operations and to price of oil having risen from ₹5 to ₹7 per 100 viss of oil sold by twinzas to others than the Burma Oil Company.
(*c*) Decrease is due to the fact that no oil was extracted by the Assam Oil Syndicate during the year. The Assam Railway and Trading Company also did not extract so much oil as in the previous year as the erection of this refinery had not been completed.
(*d*) Calculated on the crude or unrefined oil at the well.

Weights and Values of the Salt, Coal, Iron and Petroleum carried by Rail and River in British India between 1st April 1894 and the 31st March 1895.

Weight of Salt carried by Rail and River in British

IMPORTED

SALT.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORTS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	TOTAL.
QUANTITY.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
British Provinces (EXCLUDING CHIEF SEAPORTS).										
From—										
Madras . . .	...	5	...	...	...	...	...	...	...	5
Bombay . . .	29,960	...	...	...	430,543	7,900	1,438,939	397,826	...	2,305,168
Sind	...	...	...	...	...	3,046	...	...	...	3,046
Bengal	...	...	...	...	4,948	...	1,138	...	78,478	84,564
North-West Provinces and Oudh.	...	2	...	2,530	...	3,106	9,383	4	...	15,025
Panjab . . .	...	1	10,212	68,433	305,690	...	22,044	...	...	406,380
Central Provinces .	...	8	...	5,002	209	...	...	12	...	5,231
Berar . . .	...	...	...	...	...	...	165	...	...	165
Assam . . .	...	...	...	747	...	...	...	...	...	747
Total .	*29,960*	*16*	*10,212*	*76,712*	*741,390*	*14,052*	*1,471,669*	*397,842*	*78,478*	*2,820,331*
Native States.										
From—										
Rajputana and Central India.	...	458	...	157	2,834,942	261,035	101,987	...	...	3,198,579
Nizám's Dominions .	17	1,240	...	...	...	...	...	132	...	1,389
Mysore . . .	...	61	...	...	...	...	...	...	...	61
Total .	*17*	*1,759*	...	*157*	*2,834,942*	*261,035*	*101,987*	*132*	...	*3,200,029*
Chief Seaports.										
From—										
Madras Ports . .	2,263,968	15	...	...	...	...	...	...	...	2,263,983
Bombay . . .	33,599	28,539	...	...	5	24	6,322	6,638	...	75,127
Karachi . . .	...	...	193,067	...	...	603	...	...	...	193,670
Calcutta . . .	...	...	...	8,024,408	318,655	50	1,122	...	575,283	8,919,518
Total .	*2,297,567*	*28,554*	*193,067*	*8,024,408*	*318,660*	*677*	*7,444*	*6,638*	*575,283*	*11,452,298*
GRAND TOTAL IN MAUNDS	*2,327,544*	*30,329*	*203,279*	*8,101,277*	*3,894,992*	*275,764*	*1,581,100*	*404,612*	*653,761*	*17,472,658*
GRAND TOTAL IN TONS .	85,188	1,110	7,440	296,507	142,557	10,093	57,868	14,809	23,927	639,499

SALT.

India between 1st April 1894 and 31st March 1895.

INTO

NATIVE STATES.				CHIEF SEAPORTS.					GRAND TOTAL.		SALT.
Rajputana and Central India.	Nizám's Territory.	Mysore.	TOTAL.	Madras Ports.	Bombay	Karachi.	Calcutta.	TOTAL.			
Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Tons.	QUANTITY.
											British Provinces (EXCLUDING CHIEF SEAPORTS).
											From—
...	181,733	5,275	187,008	8,005	...	...	...	8,005	***195,018***	7,138	Madras.
362,212	605,551	65,429	1,033,192	1	697	...	...	698	***3,339,058***	122,210	Bombay.
...	...	...	...	...	...	...	...	...	***3,046***	111	Sind.
...	...	...	...	...	...	...	1,124	1,124	***85,688***	3,136	Bengal.
52,626	...	...	52,626	...	...	...	150	150	***67,801***	2,481	North-West Provinces and Oudh.
787	1	...	788	...	...	630	387	1,017	***408,185***	14,940	Panjab.
20,027	...	...	20,027	...	6	...	...	6	***25,264***	925	Central Provinces.
...	...	...	...	...	...	...	...	...	***165***	6	Berar.
...	...	...	...	...	...	...	...	...	***747***	27	Assam.
435,652	*787,285*	*70,704*	*1,293,641*	*8,006*	*703*	*630*	*1,661*	*11,000*	***4,124,972***	150,974	Total.
											Native States.
											From—
...	...	...	...	...	...	...	...	...	***3,198,579***	117,068	Rajputana and Central India.
...	...	...	...	...	80	...	...	80	***1,469***	54	Nizám's Dominions.
...	...	...	...	...	...	...	...	...	***61***	2	Mysore.
...	...	...	...	...	*80*	...	...	*80*	***3,200,109***	117,124	Total.
											Chief Seaports.
											From—
...	8,801	120,065	128,866	...	...	...	...	...	***2,392,849***	87,578	Madras Ports.
514	79,256	256,996	336,766	49	...	...	...	49	***411,942***	15,077	Bombay.
...	...	...	...	...	...	...	...	...	***193,670***	7,088	Karachi.
...	...	...	...	...	1	...	...	1	***8,919,519***	326,455	Calcutta.
514	*88,057*	*377,061*	*465,632*	*49*	*1*	...	...	*50*	***11,917,980***	436,198	Total.
436,166	*875,342*	*447,765*	*1,759,273*	*8,055*	*784*	*630*	*1,661*	*11,130*	***19,243,061***	...	GRAND TOTAL IN MAUNDS.
15,964	**32,038**	**16,388**	**64,390**	**295**	**29**	**23**	**60**	**407**	...	**704,298**	GRAND TOTAL IN TONS.

Value of Salt carried by Rail and River in British

IMPORTED

SALT.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORTS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	TOTAL.
VALUE.	₹	₹	₹	₹	₹	₹	₹	₹	₹	₹
British Provinces (EXCLUDING CHIEF SEAPORTS).										
From—										
Madras . . .	...	16	...	...	...	...	...	...	...	16
Bombay . . .	1,08,605	...	...	...	15,60,718	28,638	52,16,154	14,42,119	...	83,56,234
Sind	...	...	...	...	...	9,519	...	...	...	9,519
Bengal . . .	...	...	...	...	15,463	...	3,556	...	2,45,244	2,64,263
North-West Provinces and Oudh.	...	7	...	8,539	...	10,483	31,668	13	...	50,710
Panjab . . .	...	3	33,189	2,22,407	9,93,493	...	71,643	...	...	13,20,735
Central Provinces .	...	32	...	19,695	823	...	...	47	...	20,597
Berar . . .	...	...	...	...	...	...	660	...	...	660
Assam . . .	...	...	...	2,334	...	...	...	...	...	2,334
Total .	*1,08,605*	*58*	*33,189*	*2,52,975*	*25,70,497*	*48,640*	*53,23,681*	*14,42,179*	*2,45,244*	*1,00,25,068*
Native States.										
From—										
Rajputana and Central India.	...	1,660	...	491	95,67,929	8,48,364	4,01,574	...	...	1,08,20,018
Nizám's Territory .	55	4,495	...	...	...	...	...	528	...	5,078
Mysore . . .	...	221	...	...	...	...	...	...	...	221
Total .	*55*	*6,376*	...	*491*	*95,67,929*	*8,48,364*	*4,01,574*	*528*	...	*1,08,25,317*
Chief Seaports.										
From—										
Madras Ports . .	73,57,896	49	...	...	...	...	...	...	...	73,57,945
Bombay . . .	1,21,796	1,03,454	...	...	18	87	22,917	24,063	...	2,72,335
Karachi . . .	...	...	6,03,334	...	...	1,884	...	...	...	6,05,218
Calcutta . . .	...	...	...	2,50,76,274	9,95,797	156	3,506	...	17,97,759	2,78,73,492
Total .	*74,79,692*	*1,03,503*	*6,03,334*	*2,50,76,274*	*9,95,815*	*2,127*	*26,423*	*24,063*	*17,97,759*	*3,61,08,990*
TOTAL VALUE .	75,88,352	1,09,937	6,36,523	2,53,29,740	1,31,34,241	8,99,131	57,51,678	14,66,770	20,43,003	5,69,59,375

SALT.

India between 1st April 1894 and 31st March 1895.

INTO										
NATIVE STATES.				CHIEF SEAPORTS.					GRAND TOTAL.	SALT.
Rajputana and Central India.	Nizám's Territory.	Mysore.	Total.	Madras Ports.	Bombay.	Karachi.	Calcutta.	Total.		
R	R	R	R	R	R	R	R	R	R	VALUE.
										British Provinces (EXCLUDING CHIEF SEAPORTS).
										From—
...	5,90,632	17,144	6,07,776	26,016	...	...	...	26,016	***6,33,808***	Madras.
13,13,019	21,95,122	37,180	37,45,321	4	2,527	...	...	2,531	***1,21,04,086***	Bombay.
...	...	...	...	...	...	...	...	...	***9,519***	Sind.
...	...	...	...	...	...	...	3,512	3,512	***2,67,775***	Bengal.
1,77,613	...	...	1,77,613	...	...	...	506	506	***2,28,829***	North-West Provinces and Oudh.
2,558	3	...	2,561	...	...	2,047	1,258	3,305	***13,26,601***	Panjab.
78,856	...	...	78,856	...	24	...	...	24	***99,477***	Central Provinces.
...	...	...	...	...	...	...	...	...	***660***	Berar.
...	...	...	...	...	...	...	...	...	***2,334***	Assam.
15,72,046	*27,85,757*	*2,54,324*	*46,12,127*	*26,020*	*2,551*	*2,047*	*5,276*	*35,894*	***1,46,73,089***	Total.
										Native States.
										From—
...	...	...	...	...	...	...	...	...	***1,08,20,018***	Rajputana and Central India.
...	...	...	...	...	290	...	...	290	***5,368***	Nizám's Territory.
...	...	...	...	...	...	...	...	...	***221***	Mysore.
...	...	...	...	...	*290*	...	...	*290*	***1,08,25,607***	Total.
										Chief Seaports.
										From—
...	28,603	3,90,211	4,18,814	...	...	...	...	...	***77,76,759***	Madras Ports.
1,863	2,87,303	9,31,611	12,20,777	178	...	...	...	178	***14,93,290***	Bombay.
...	...	...	...	...	...	...	...	...	***6,05,218***	Karachi.
...	...	...	...	...	3	...	...	3	***2,78,73,495***	Calcutta.
1,863	*3,15,906*	*13,21,822*	*16,39,591*	*178*	*3*	...	...	*181*	***3,77,48,762***	Total.
3,909	31,01,663	15,76,146	62,51,718	26,198	2,844	2,047	5,276	36,365	***6,32,47,458***	GRAND TOTAL.

Weight of Coal and Coke carried by Rail and River in British

IMPORTED

COAL AND COKE.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORTS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
QUANTITY.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
British Provinces (EXCLUDING CHIEF SEAPORTS).										
From—										
Madras . . .	...	26,380	...	...	...	...	...	...	...	26,380
Bombay . . .	...	...	...	...	...	58,359	2,328	7,394	...	68,081
Sind	...	...	...	...	...	414	...	...	...	414
Bengal . . .	...	156,921	...	...	9,429,253	461,630	879,410	119,087	1,000	11,047,301
North-West Provinces and Oudh.	...	7,106	...	...	...	2,208,854	87,490	...	...	2,303,450
Panjab . . .	...	...	...	...	9,794	...	...	...	...	9,794
Central Provinces .	...	1,022,381	...	...	...	...	...	713,987	...	1,736,368
Berar . . .	...	12,191	...	...	...	...	13	...	...	12,204
Assam . . .	...	...	...	1,576,593	...	...	...	...	...	1,576,593
Total .	...	1,224,979	...	1,576,593	9,439,047	2,729,257	969,241	840,468	1,000	16,780,585
Native States.										
From—										
Rajputana and Central India.	...	467,006	...	...	1,248,409	5,523	945,358	17,288	...	2,683,584
Nizám's Territory .	3,641,290	1,805,285	...	...	...	...	...	...	...	5,446,575
Mysore . . .	22,287	19	...	...	...	...	...	...	...	22,306
Total .	3,663,577	2,272,310	...	...	1,248,409	5,523	945,358	17,288	...	8,152,465
Chief Seaports.										
From—										
Madras Ports . .	653,216	4	...	...	...	...	...	...	...	653,220
Bombay . . .	87	2,556,173	...	...	...	...	88,141	1,649	...	2,646,050
Karachi . . .	...	...	193,297	...	...	9,586	...	...	...	202,883
Calcutta . . .	...	...	...	1,079,295	...	...	...	...	96,290	1,175,585
Total .	653,303	2,556,177	193,297	1,079,295	...	9,586	88,141	1,649	96,290	4,677,738
GRAND TOTAL IN MAUNDS	4,316,880	6,053,466	193,297	2,655,888	10,687,456	2,744,366	2,002,740	859,405	97,290	29,610,788
GRAND TOTAL IN TONS.	157,998	221,557	7,07	97,205	391,161	100,444	73,300	31,454	3,561	1,083,755

COAL.

India between 1st April 1894 and 31st March 1895.

INTO

NATIVE STATES.				CHIEF SEAPORTS.					GRAND TOTAL.		COAL AND COKE.
Rajputana and Central India.	Nizám's Territory.	Mysore.	Total.	Madras Ports.	Bombay.	Karachi.	Calcutta.	TOTAL.			
Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Tons.	QUANTITY.
											British Provinces (EXCLUDING CHIEF SEAPORTS).
											From—
...	220	60,929	61,149	60,359	...	...	...	60,359	***147,888***	5,413	Madras.
792,498	270	...	792,768	...	284,726	...	...	284,726	***1,145,575***	41,928	Bombay.
...	...	...	...	...	...	5	...	5	***419***	15	Sind.
304,865	...	...	304,865	...	...	...	27,362,158	27,362,158	***38,714,324***	1,416,944	Bengal.
627,926	...	...	627,926	...	5	...	...	5	***2,931,381***	107,289	North-West Provinces and Oudh.
...	...	...	...	...	...	...	...	...	***9,794***	358	Panjab.
105,354	...	...	105,354	...	14	...	...	14	***1,841,736***	67,408	Central Provinces.
...	...	...	...	...	3,407	...	...	3,407	***15,611***	571	Berar.
...	...	...	...	...	...	...	317,743	317,743	***1,894,336***	69,333	Assam.
1,830,643	*490*	*60,929*	*1,892,062*	*60,359*	*288,152*	*5*	*27,679,901*	*28,028,417*	***46,701,064***	1,709,259	Total.
											Native States.
											From—
...	...	...	...	...	...	...	...	...	***2,683,584***	98,219	Rajputana and Central India.
...	...	...	...	41,450	5,861	...	...	47,311	***5,493,886***	201,076	Nizám's Territory.
...	...	...	...	...	...	...	...	...	***22,306***	817	Mysore.
...	...	...	...	*41,450*	*5,861*	...	...	47,311	***8,199,776***	300,112	Total.
											Chief Seaports.
											From—
...	285	2,169,143	2,169,423	...	...	...	...	...	***2,822,648***	103,309	Madras Ports.
183,007	1,637	2	184,646	...	...	...	...	...	***2,830,696***	103,603	Bombay.
...	...	...	...	...	...	...	...	...	***202,883***	7,425	Karachi.
194	...	...	194	...	1	..	...	1	***1,175,780***	43,034	Calcutta.
183,201	*1,922*	*2,169,145*	*2,354,268*	...	*1*	...	...	*1*	***7,032,007***	257,371	Total.
2,013,844	*2,412*	*2,230,074*	*4,246,330*	*101,809*	*294,014*	*5*	*27,679,901*	*28,075,729*	***61,932,847***	...	GRAND TOTAL IN MAUNDS.
73,707	88	81,621	155,416	3,726	10,761	...	1,013,084	1,027,571	...	2,266,742	GRAND TOTAL IN TONS.

Value of Coal and Coke carried by Rail and River in British

IMPORTED

COAL AND COKE.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORTS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
VALUE.	₹	₹	₹	₹	₹	₹	₹	₹	₹	₹
British Provinces (EXCLUDING CHIEF SEAPORTS).										
From—										
Madras	...	18,136	...	...	...	...	...	...	...	18,136
Bombay	...	...	...	...	...	36,475	1,455	4,621	...	42,551
Sind	...	...	...	...	...	414	...	...	...	414
Bengal	...	78,460	...	...	47,14,626	2,30,815	4,39,705	59,544	500	55,23,650
North-West Provinces and Oudh.	...	3,553	...	...	...	11,04,427	43,745	...	...	11,51,725
Panjab	...	...	...	...	12,242	...	...	...	...	12,242
Central Provinces	...	2,55,595	...	...	...	...	...	1,78,497	...	4,34,092
Berar	...	6,096	...	...	...	...	6	...	...	6,102
Assam	...	...	...	7,88,297	...	...	...	...	...	7,88,297
Total	...	3,61,840	...	7,88,297	47,26,868	13,72,131	4,84,911	2,42,662	500	79,77,209
Native States.										
From—										
Rajputana and Central India.	...	2,91,879	...	...	6,24,204	6,904	2,36,340	8,644	...	11,67,971
Nizám's Territory	25,03,087	11,28,303	...	...	...	...	...	...	...	36,31,690
Mysore	15,322	12	...	...	...	...	...	...	...	15,334
Total	25,18,709	14,20,194	...	...	6,24,204	6,904	2,36,340	8,644	...	48,14,995
Chief Seaports.										
From—										
Madras Ports	4,49,086	3	...	...	...	...	...	...	...	4,49,089
Bombay	54	15,97,608	...	...	...	...	55,088	1,031	...	16,53,781
Karachi	...	...	1,93,297	...	...	9,586	...	...	...	2,02,883
Calcutta	...	...	...	5,39,647	...	...	...	...	48,145	5,87,792
Total	4,49,140	15,97,611	1,93,297	5,39,647	...	9,586	55,088	1,031	48,145	28,93,545
TOTAL VALUE	29,67,849	33,79,645	1,93,297	13,27,944	53,51,072	13,88,621	7,76,339	2,52,337	48,645	1,56,85,749

COAL.

India between 1st April 1894 and 31st March 1895.

INTO.

NATIVE STATES.				CHIEF SEAPORTS.					GRAND TOTAL.	COAL AND COKE.
Rajputana and Central India.	Nizám's Territory.	Mysore.	Total.	Madras Ports.	Bombay.	Karachi.	Calcutta.	Total.		
₹	₹	₹	₹	₹	₹	₹	₹	₹	₹	VALUE.
										British Provinces (EXCLUDING CHIEF SEAPORTS).
										From—
...	151	41,889	42,040	41,497	...	...	...	41,497	***1,01,673***	Madras.
4,95,311	169	...	4,95,480	...	1,77,954	...	...	1,77,954	***7,15,985***	Bombay.
...	...	...	...	...	...	5	...	5	***419***	Sind.
1,52,433	...	...	1,52,433	...	...	...	1,36,81,079	1,36,81,079	***1,93,57,162***	Bengal.
3,13,963	...	...	3,13,963	...	2	...	...	2	***14,65,690***	North-West Provinces and Oudh.
...		...	...	...	...	...	...	...	***12,242***	Panjab.
26,339	...	...	26,339	...	4	...	...	4	***4,60,435***	Central Provinces.
...	...	...	...	...	1,703	...	...	1,703	***7,805***	Berar.
...	...	...	...	...	...	...	1,58,871	1,58,871	***9,47,168***	Assam.
9,88,046	*320*	*41,889*	*10,30,255*	*41,497*	*1,79,663*	*5*	*1,38,39,950*	*1,40,61,115*	***2,30,68,579***	Total.
										Native States.
										From—
...	...	...	...	...	...	...	...	...	***11,67,971***	Rajputana and Central India.
...	...	...	...	28,497	3,663	...	...	32,160	***36,63,850***	Nizám's Territory.
...	...	...	...	...	...	...	...	...	***15,334***	Mysore.
...	...	...	...	*28,497*	*3,663*	...	...	*32,160*	***48,47,155***	Total.
										Chief Seaports.
										From—
...	196	14,91,286	14,91,482	...	...	...	...	...	***19,40,571***	Madras Ports.
1,14,380	1,023	1	1,15,404	...	...	...	...	...	***17,69,185***	Bombay.
...	...	...	...	...	...	...	...	...	***2,02,883***	Karachi.
97	...	...	97	...	1	...	...	1	***587,890***	Calcutta.
1,14,477	*1,219*	*14,91,287*	*1,06,983*	...	*1*	...	...	*1*	***5,00,529***	Total.
11,02,523	1,539	15,33,176	26,37,238	69,994	1,83,273	5	1,38,39,950	140,93,276	***3,24,16,263***	TOTAL VALUE.

Weight of Iron carried by Rail and River in British

IMPORTED

IRON.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORTS).									
	Madras	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
QUANTITY.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
British Provinces (EXCLUDING CHIEF SEAPORTS).										
From—										
Madras . . .	...	2,470	...	...	...	...	3	...	...	2,473
Bombay . . .	7,813	...	...	...	415	497	6,000	8,787	...	23,512
Sind	...	...	...	...	44	32,831	...	...	...	32,875
Bengal . . .	1	5	...	...	82,298	18,410	27,734	2	1,894	130,344
North-West Provinces and Oudh.	337	785	102	136,228	...	36,900	4,410	51	...	178,813
Central Provinces .	165	88	2,734	2,388	50,286	...	527	11	...	56,199
Panjab . . .	6	2,270	...	7,225	4,465	1,739	...	2,827	...	18,532
Berar	136	5,228	...	...	3	42	1,678	...	...	7,087
Assam . . .	...	...	...	689	...	...	...	...	...	689
Total .	*8,458*	*10,846*	*2,836*	*146,530*	*137,511*	*90,419*	*40,352*	*11,678*	*1,894*	*450,524*
Native States.										
From—										
Rajputana and Central India.	13	1,824	22	216	15,321	3,054	1,861	123	...	22,434
Nizám's Territory .	966	1,728	...	...	12	2	481	...	...	3,189
Mysore . . .	9,194	926	...	...	6	...	3	...	...	10,129
Total .	*10,173*	*4,478*	*22*	*216*	*15,339*	*3,056*	*2,345*	*123*	...	*35,752*
Chief Seaports.										
From—										
Madras Ports . .	430,705	612	...	16	10	5	17	22	...	431,387
Bombay . . .	15,271	951,147	77	113	89,049	123,896	157,888	90,822	...	1,428,263
Karachi . . .	...	...	34,127	...	57,482	536,495	33	...	...	628,137
Calcutta . . .	32	77	16	996,471	433,979	62,551	29,387	63	183,038	1,705,614
Total .	*446,008*	*951,836*	*34,220*	*996,600*	*580,520*	*722,947*	*187,325*	*90,907*	*183,038*	*4,193,401*
TOTAL IN MAUNDS .	*464,639*	*967,160*	*37,078*	*1,143,346*	*733,370*	*816,422*	*230,022*	*102,708*	*184,932*	*4,679,677*
TOTAL IN TONS . .	17,006	35,398	1,357	41,846	26,841	29,881	8,419	3,759	6,769	171,276

IRON.

India between 1st April 1894 and 31st March 1895.

INTO											
NATIVE STATES.				CHIEF SEAPORTS.					GRAND TOTAL.		IRON.
Rajputana and Central India.	Nizám's Territory.	Mysore.	Total.	Madras Ports.	Bombay	Karachi.	Calcutta.	Total.			
Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Tons.	QUANTITY.
											British Provinces (EXCLUDING CHIEF SEAPORTS).
											From—
4	7,071	5,670	12,745	34,945	319	...	...	35,264	***50,482***	1,848	Madras.
4,155	7,125	6,841	18,121	33	32,889	...	...	32,922	***74,555***	2,729	Bombay.
...	...	...	...	...	6	3,984	...	3,990	***36,865***	1,349	Sind.
979	...	...	979	4	55	...	103,434	103,493	***234,816***	8,594	Bengal.
22,305	44	...	22,349	110	634	12	16,674	17,430	***218,592***	8,000	North-West Provinces and Oudh.
11,115	1	...	11,116	...	422	600	827	1,849	***69,164***	2,531	Panjab.
9,481	7	92	9,580	...	2,796	1	1,157	3,954	***32,066***	1,174	Central Provinces.
41	61	...	102	5	1,012	...	1,517	2,534	***9,723***	356	Berar.
...	...	...	...	...	...	...	1,742	1,742	***2,431***	89	Assam.
48,080	*14,309*	*12,603*	*74,992*	*35,097*	*38,133*	*4,597*	*125,351*	*203,178*	***728,694***	26,670	Total.
											Native States.
											From—
...	...	...	...	57	497	...	372	926	***23,360***	855	Rajputana and Central India.
...	...	...	...	962	436	...	...	1,398	***4,587***	168	Nizám's Territory.
...	...	...	...	7,335	188	...	...	7,523	***17,652***	646	Mysore.
...	*...*	*...*	*...*	*8,354*	*1,121*	*...*	*372*	*9,847*	***45,599***	1,669	Total.
											Chief Seaports.
											From—
20	12,401	203,807	216,228	...	141	...	...	141	***647,756***	23,708	Madras Ports.
193,237	259,856	14,864	467,957	1,817	...	4	326	2,147	***1,898,367***	69,480	Bombay.
542	...	...	542	...	...	...	3	3	***628,682***	23,010	Karachi.
9,692	46	37	9,775	8	91	48	...	147	***1,715,536***	62,789	Calcutta.
203,491	*272,303*	*218,708*	*694,502*	*1,825*	*232*	*52*	*329*	*2,438*	***4,890,341***	178,987	Total.
251,571	*286,612*	*231,311*	*769,494*	*45,276*	*39,486*	*4,649*	*126,052*	*215,463*	***5,664,634***	...	TOTAL IN MAUNDS.
9,208	10,490	8,466	28,164	1,657	1,445	170	4,614	7,286	...	207,328	TOTAL IN TONS.

Value of Iron carried by Rail and River in British

IMPORTED

IRON.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORTS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
VALUE.	₹	₹	₹	₹	₹	₹	₹	₹	₹	₹
British Provinces (EXCLUDING CHIEF SEAPORTS).										
From—										
Madras . . .	...	10,806	...	...	...	...	13	...	...	10,819
Bombay . . .	37,112	...	...	...	1,971	2,361	28,500	41,738	...	1,11,682
Sind	...	...	...	...	176	1,31,324	...	...	...	1,31,500
Bengal . . .	5	26	...	...	4,32,065	96,652	1,45,603	10	9,944	6,84,305
North-West Provinces and Oudh.	2,106	4,906	637	8,51,425	...	2,30,625	27,562	319	...	11,17,580
Panjab . . .	742	396	12,303	10,746	2,26,287	...	2,371	50	...	2,52,895
Central Provinces .	42	15,748	...	50,123	30,976	12,064	...	19,612	...	1,28,565
Berar	1,088	41,824	...	...	24	336	13,424	...	...	56,696
Assam . . .	...	...	...	3,617	...	...	...	...	...	3,617
Total .	*41,095*	*73,706*	*12,940*	*9,15,911*	*6,91,499*	*4,73,362*	*2,17,473*	*61,729*	*9,944*	*24,97,659*
Native States.										
From—										
Rajputana and Central India	57	8,664	88	1,134	95,756	13,743	12,911	984	...	1,33,337
Nizám's Territory .	4,226	8,208	...	...	75	9	3,337	...	...	15,855
Mysore . . .	40,224	4,398	...	...	37	...	21	...	...	44,680
Total .	*44,507*	*21,270*	*88*	*1,134*	*95,868*	*13,752*	*16,269*	*984*	...	*1,93,872*
Chief Seaports.										
From—										
Madras Ports . .	18,84,334	2,678	...	70	44	22	74	96	...	18,87,318
Bombay . . .	72,537	45,17,948	366	537	4,22,983	5,88,506	7,49,968	4,31,404	...	67,84,249
Karachi . . .	...	...	1,36,508	...	2,29,928	21,45,980	132	...	...	25,12,548
Calcutta . . .	168	404	84	52,31,473	22,78,390	3,28,393	1,54,282	331	9,60,950	89,54,475
Total .	*19,57,039*	*45,21,030*	*1,36,958*	*52,32,080*	*29,31,345*	*30,62,901*	*9,04,456*	*4,31,831*	*9,60,950*	*2,01,38,590*
TOTAL VALUE .	20,42,641	46,16,006	1,49,986	61,49,125	37,18,712	35,50,015	11,38,198	4,94,544	9,70,894	2,28,30,121

IRON.

India between 1st April 1894 and 31st March 1895.

INTO										
NATIVE STATES.				CHIEF SEAPORTS.					GRAND TOTAL.	IRON.
Rajputana and Central India.	Nizám's Territory.	Mysore.	Total.	Madras Ports.	Bombay.	Karachi.	Calcutta.	Total.		
₹	₹	₹	₹	₹	₹	₹	₹	₹	₹	VALUE.
										British Provinces (EXCLUDING CHIEF SEAPORTS).
										From—
18	30,936	24,806	55,760	1,52,884	1,396	...	...	1,54,280	***2,20,859***	Madras.
19,736	33,844	32,495	86,075	157	1,56,223	...	...	1,56,380	***3,54,137***	Bombay.
...	...	...	...	...	24	15,936	...	15,960	***1,47,460***	Sind.
5,140	...	...	5,140	21	289	...	5,43,029	5,43,339	***12,32,784***	Bengal.
1,39,406	275	...	1,39,681	687	3,962	75	1,04,212	1,08,936	***13,66,197***	North-West Provinces and Oudh.
50,018	4	...	50,022	...	1,899	2,700	3,722	8,321	***3,11,238***	Panjab.
65,774	49	638	66,461	...	19,397	7	8,027	27,431	***2,22,457***	Central Provinces.
328	488	...	816	40	8,096	....	12,136	20,272	***77,784***	Berar.
...	...	...	...	...	...	...	9,145	9,145	***12,762***	Assam.
2,80,420	*65,596*	*57,939*	*4,03,955*	*1,53,789*	*1,91,286*	*18,718*	*6,80,271*	*10,44,064*	***39,45,678***	Total.
										Native States.
										From—
...	...	...	...	249	2,361	...	1,953	4,563	***1,37,900***	Rajputana and Central India.
...	...	...	...	4,209	2,071	...	...	6,280	***22,135***	Nizam's Territory.
...	...	...	...	32,091	893	...	...	32,984	***77,664***	Mysore.
...	...	...	...	*36,549*	*5,325*	...	*1,953*	*43,827*	***2,37,699***	Total.
										Chief Seaports.
										From—
88	54,254	8,91,656	9,45,998	...	617	...	...	617	***28,33,933***	Madras Ports.
9,17,876	12,34,316	70,604	22,22,796	8,631	...	19	1,548	10,198	***90,17,243***	Bombay.
2,168	...	...	2,168	...	...	...	12	12	***25,14,728***	Karachi.
50,883	241	194	51,318	42	478	252	...	772	***90,06,565***	Calcutta.
9,71,015	*12,88,811*	*9,62,454*	*32,22,280*	*8,673*	*1,095*	*271*	*1,560*	*11,599*	***2,33,72,469***	Total.
12,51,435	1,354,407	1,020,393	36,26,235	1,99,011	1,97,706	18,989	6,83,784	10,99,490	***2,75,55,846***	TOTAL VALUE.

Weight of Petroleum (Kerosine) carried by Rail and River in British

IMPORTED

PETROLEUM.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORTS),									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
QUANTITY.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
British Provinces (EXCLUDING CHIEF SEAPORTS).										
From—										
Madras . . .	...	...	...	...	...	...	...	...	...	...
Bombay . . .	5,914	...	...	...	...	19	13,234	40,654	...	59,821
Sind	...	...	...	...	...	12,976	...	...	...	12,976
Bengal	...	...	24	...	475,790	50,516	116,247	290	55,031	697,898
North-West Provinces and Oudh.	...	...	...	5	...	1,829	385	...	...	2,219
Panjab . . .	...	...	71	22	1,958	...	...	...	...	2,051
Central Provinces .	...	...	...	64	38	...	...	8	...	110
Berar . . .	...	...	...	...	...	...	9	...	...	9
Assam . . .	...	...	...	717	...	...	...	...	...	717
Total	*5,914*	...	*95*	*808*	*477,786*	*65,340*	*129,875*	*40,952*	*55,031*	*775,801*
Native States.										
From—										
Rajputana and Central India.	...	6	...	...	182	40	302	...	...	530
Nizám's Territory	109	...	...	...	...	...	...	...	...	109
Mysore	902	...	...	...	...	...	...	...	...	902
Total .	*1,011*	*6*	...	...	*182*	*40*	*302*	...	...	*1,541*
Chief Seaports.										
From—										
Madras Ports . .	188,292	...	...	...	...	...	...	...	...	188,292
Bombay . . .	1,839	267,714	...	...	18,059	6,706	132,053	95,995	...	522,366
Karachi . . .	...	...	11,630	...	11,123	197,355	...	...	...	220,108
Calcutta . . .	...	...	..	738,200	8,496	1,101	1,499	...	105,505	854,801
Total .	*190,131*	*267,714*	*11,630*	*738,200*	*37,678*	*205,162*	*133,552*	*95,995*	*105,505*	*1,785,567*
TOTAL IN MAUNDS .	*197,056*	*267,720*	*11,725*	*739,008*	*515,646*	*270,542*	*263,729*	*136,947*	*160,536*	*2,562,909*
TOTAL IN GALLONS .	1,576,448	2,141,760	93,800	5,912,064	4,125,168	2,164,336	2,109,832	1,095,576	1,284,288	20,503,272

IN PETROLEUM.

India between 1st April 1894 and 31st March 1895.

INTO											
NATIVE STATES.				CHIEF SEAPORTS.					GRAND TOTAL.		PETROLEUM.
Rajputana and Central India.	Nizám's Territory.	Mysore.	Total.	Madras Ports.	Bombay.	Karachi.	Calcutta.	Total.			
Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Gallons.	QUANTITY.
											British Provinces (EXCLUDING CHIEF SEAPORTS).
											From—
...	15,931	89	16,020	3,182	...	...	...	3,182	***19,202***	153,616	Madras.
2,680	2,036	22,849	27,565	...	168	...	...	168	***87,554***	700,432	Bombay.
...	...	...	...	...	...	...	...	...	***12,976***	103,808	Sind.
10,562	...	1	10,563	...	...	1	192,159	192,160	***900,621***	7,204,968	Bengal.
4,582	...	...	4,582	...	...	...	...	...	***6,801***	54,408	North-West Provinces and Oudh.
684	...	...	684	...	...	12	...	12	***2,747***	21,976	Panjab.
784	...	...	784	...	...	...	...	...	***894***	7,152	Central Provinces.
...	...	...	...	...	...	...	...	...	***9***	72	Berar.
...	...	...	...	...	...	...	...	...	***717***	5,736	Assam.
19,292	*17,967*	*22,939*	*60,198*	*3,182*	*168*	*13*	*192,159*	*195,522*	***1,031,521***	8,252,168	Total.
											Native States.
											From—
...	...	...	...	...	...	...	...	...	***530***	4,240	Rajputana and Central India.
...	...	...	...	65	...	...	...	65	***174***	1,392	Nizám's Territory.
...	...	...	...	236	...	...	...	236	***1,138***	9,104	Mysore.
...	...	...	...	*301*	...	...	...	*301*	***1,842***	14,736	Total.
											Chief Seaports.
											From—
...	19,121	70,185	89,306	...	...	...	...	...	***277,598***	2,220,784	Madras Ports.
141,401	24,643	2,533	168,577	29	...	...	...	29	***690,972***	5,527,776	Bombay.
...	...	...	...	...	...	...	...	...	***220,108***	1,760,864	Karachi.
409	...	...	409	...	...	...	...	...	***855,210***	6,841,680	Calcutta.
141,810	*43,764*	*72,718*	*258,292*	*29*	...	...	...	*29*	***2,043,888***	16,351,104	Total.
161,102	*61,731*	*95,657*	*318,490*	*3,512*	*168*	*13*	*192,159*	*195,852*	***3,077,251***	.....	TOTAL IN MAUNDS.
1,288,816	493,848	7,65,256	2,547,920	28,096	1,344	104	1,537,272	1,566,816	...	24,618,008	TOTAL IN GALLONS.

Value of Petroleum (Kerosine) carried by

IMPORTED

PETROLEUM.	BRITISH PROVINCES (EXCLUDING CHIEF SEAPORTS).									
	Madras.	Bombay.	Sind.	Bengal.	North-West Provinces and Oudh.	Panjab.	Central Provinces.	Berar.	Assam.	Total.
VALUE.	₹	₹	₹	₹	₹	₹	₹	₹	₹	₹
British Provinces (EXCLUDING CHIEF SEAPORTS).										
From—										
Madras	...	...	...	...	...	...	...	...	...	...
Bombay	25,134	...	...	...	...	81	56,245	1,72,779	...	2,54,239
Sind	...	...	...	...	...	50,282	...	...	...	50,282
Bengal	...	...	96	...	19,03,160	2,02,064	4,64,988	1,160	2,20,124	27,91,592
North-West Provinces and Oudh.	...	...	...	25	...	9,145	1,925	...	....	11,096
Panjab	...	...	364	113	10,035	...	...	...	...	10,512
Central Provinces	...	...	...	356	211	...	...	45	...	612
Berar	...	...	...	...	...	...	46	...	...	46
Assam	...	...	...	2,868	...	...	...	...	...	2,868
Total	*25,134*	...	*460*	*3,362*	*19,13,406*	*2,61,572*	*5,23,204*	*1,73,984*	*2,20,124*	*31,21,246*
Native States.										
From—										
Rajputana and Central India.	...	26	...	...	910	205	1,680	...	...	2,821
Nizám's Territory	477	...	...	...	...	...	...	...	...	477
Mysore	3,946	...	...	...	...	...	...	...	...	3,946
Total	*4,423*	*26*	...	...	*910*	*205*	*1,680*	...	...	*7,244*
Chief Seaports.										
From—										
Madras Ports	8,23,778	...	...	...	...	...	...	...	...	8,23,778
Bombay	7,816	11,37,785	...	...	76,751	28,500	5,61,225	4,07,979	...	22,20,056
Karachi	...	...	45,066	...	43,102	7,64,751	...	...	...	8,52,919
Calcutta	...	...	...	29,52,800	33,984	4,404	5,996	...	4,22,020	34,19,204
Total	*8,31,594*	*11,37,785*	*45,066*	*29,52,800*	*1,53,837*	*7,97,655*	*5,67,221*	*4,07,979*	*4,22,020*	*73,15,957*
TOTAL VALUE	8,61,151	11,37,811	45,526	29,56,162	20,68,153	10,59,432	10,92,105	5,81,963	6,42,144	1,04,44,447

PETROLEUM.

Rail and River in British India between 1st April 1894 and 31st March 1895.

INTO										
NATIVE STATES.				CHIEF SEAPORTS.					GRAND TOTAL.	PETROLEUM.
Rajputana and Central India.	Nizám's Territory.	Mysore.	Total.	Madras Ports.	Bombay.	Karachi.	Calcutta.	Total.		
R	R	R	R	R	R	R	R	R	R	VALUE.
										British Provinces (EXCLUDING CHIEF SEAPORTS).
										From—
...	69,698	390	70,088	13,921	...	...	...	13,921	***84,009***	Madras.
11,390	8,653	97,108	1,17,151	...	714	...	...	714	***3,72,104***	Bombay.
...	...	...	...	...	...	...	...	...	***50,282***	Sind.
42,248	...	4	42,252	...	...	4	7,68,636	7,68,640	***36,02,484***	Bengal.
22,910	...	...	22,910	...	...	...	...	...	***34,005***	North-West Provinces and Oudh.
3,505	...	...	3,505	...	...	62	...	62	***14,079***	Panjab.
4,361	...	...	4,361	...	...	...	...	...	***4,973***	Central Provinces.
...	...	...	...	...	...	...	...	...	***46***	Berar.
...	...	...	...	...	...	...	...	...	***2,868***	Assam.
84,414	*78,351*	*97,502*	*2,60,267*	*13,921*	*714*	*66*	*7,68,636*	*7,83,337*	***41,64,850***	Total.
										Native States.
										From—
...	...	...	...	...	...	...	...	...	***2,821***	Rajputana and Central India.
...	...	...	...	284	...	...	...	284	***761***	Nizám's Territory.
...	...	...	...	1,033	...	...	...	1,033	***4,979***	Mysore.
...	...	...	...	*1,317*	...	...	...	*1,317*	***8,561***	Total.
										Chief Seaports.
										From—
...	83,654	3,07,059	3,90,713	...	...	...	...	...	***12,14,491***	Madras Ports.
6,00,954	1,04,733	10,765	7,16,452	123	...	...	...	123	***29,36,631***	Bombay.
...	...	...	...	...	...	...	...	...	***8,52,919***	Karachi.
1,636	...	...	1,636	...	...	...	...	...	***34,20,840***	Calcutta.
6,02,590	*1,88,387*	*3,17,824*	*11,08,801*	*123*	...	...	...	*123*	***84,24,881***	Total.
6,87,004	2,66,738	4,15,326	13,69,068	15,361	714	66	7,68,636	7,84,777	***1,25,98,292***	TOTAL VALUE.

APPENDIX I.

Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive.

Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
1. Madras	Godavari, Bhadrachalam Taluk.	Godavari Coal Co. (Messrs. Binny & Co.)	Coal	M. L.	10½ square miles	...	20 years.
2. Madras	Godavari, Bhadrachalam Taluk.	Eyekirl Hugh Philips.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
3. Madras	Godavari, Bhadrachalam Taluk.	George Lawson Chambers.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
4. Madras	Godavari, Bhadrachalam Taluk.	John Alexander Boyson.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
5. Madras	Godavari, Bhadrachalam Taluk.	Archibald Hunter MacMillan.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
6. Madras	Godavari, Bhadrachalam Taluk.	Stuart Hall	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
7. Madras	Godavari, Bhadrachalam Taluk.	Alister Macnab	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
8. Madras	Godavari, Bhadrachalam Taluk.	Dorning Rasbotham.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
9. Madras	Godavari, Bhadrachalam Taluk.	Clement Bell Simpson.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
10. Madras	Godavari, Bhadrachalam Taluk.	John Campbell	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
11. Madras	Godavari, Bhadrachalam Taluk.	William Lambert.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
12. Madras	Godavari, Bhadrachalam Taluk.	John Wilkinson Chambres.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
13. Madras	Godavari, Bhadrachalam Taluk.	Alfred Percival Symonds.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
14. Madras	Godavari, Bhadrachalam Taluk.	Thomas Kipping.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
15. Madras	Godavari, Bhadrachalam Taluk.	Arthur Worthington Maude.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
16. Madras	Godavari, Bhadrachalam Taluk.	George Henry White.	Coal	P. L.	Half a square mile	21st March 1890.	6 months.
17. Madras	Godavari, Bhadrachalam Taluk.	William Martin	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
18. Madras	Godavari, Bhadrachalam Taluk.	Herbert Phillips	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
19. Madras	Godavari, Bhadrachalam Taluk.	William Young Fleming.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
20. Madras	Godavari, Bhadrachalam Taluk.	William Macnab.	Coal	P. L.	Half a square mile	31st March 1890.	6 months.
21. Madras	Godavari, Bhadrachalam Taluk.	Francis Phillips	Coal	P. L.	Half a square mile	31st March 1890.	6 months.

NOTE.—P. L. denotes Prospecting License. E. L. denotes Exploring License. M. L. denotes Mining Lease.

Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of Grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
2. Madras .	Godavari, Bhadrachalam Taluk.	Hugh Garden .	Coal . .	P. L. .	Half a square mile . . .	31st March 1890.	6 months.
3. Madras .	Coimbatore (Kollegal Taluq).	W. T. Hamilton Holmes.	Gold and metals other than gold.	P. L. .	848 acres	8th May 1889.	6 months, but subsequently extended to 9 months.
4. Madras .	Nellore .	E. H. Sargent .	Mica . .	M. L. .	10 acres	15th July 1890.	2 years.
5. Madras .	Nellore .	Pillatti Rami Radi and P. Kistnasami Pillai.	Mica . .	M. L. .	10 acres	29th May 1890.	2 years.
6. Madras .	Nellore .	Mahomed Ghouse Moideen Sahib.	Mica . .	M. L. .	5 acres	20th December 1890.	2 years.
7. Madras .	Nellore .	Mahomed Kyrulla Sahib.	Mica . .	M. L. .	1 acre	17th March 1891.	2 years.
8. Madras .	Nellore .	Oosur Narayanappa.	Mica . .	M. L. .	2 acres and 25 cents . . .	2nd April 1891.	2 years.
9. Madras .	Nellore .	Messrs. Kudder Badsha and Hadi Badsha.	Mica . .	M. L. .	4 acres and 20 cents . . .	17th November 1891.	2 years.
10. Madras .	Nellore .	Devarapati Basi Reddi.	Mica . .	M. L. .	8 acres and 66 cents . . .	8th May 1891.	2 years.
11. Madras .	Nellore .	Auchoor Subba Nayadu.	Mica . .	M. L. .	14 acres	28th April 1891.	2 years.
12. Madras .	Nellore .	Yelchoor Lakshmayya.	Mica . .	M. L. .	2 acres and 10 cents . . .	21st April 1891.	2 years.
13. Madras .	Nellore	Duvour Gobinda Chetty.	Mica . .	M. L. .	3 acres and 80 cents . . .	28th September 1891.	2 years.
14. Madras .	Chingleput District, Conjeevaram and Tiruvallur Taluks.	Arkonam Coal Company (Limited). (Messrs. Leighton & Co.)	Coal . .	P. L. .	2·74 square miles of unoccupied Government waste land scattered in small patches in 34 villages covering a total area of 40 miles.	12th November 1894.	1 year.
15. Bengal	Manbhum .	Bengal Iron and Steel Company, Limited.	Coal . .	M. L. .	Mauzas Kooltee, Raideeh Chuck Pinjah, Kendwa, and Mahatadeeh.	1st October 1889.	999 years.
16. Bengal .	Darjeeling .	Messrs. Octavius, Steel & Co.	Coal . .	M. L. .	$3\frac{1}{8}$ square miles or 2,000 acres .	...	20 years.
17. Bengal .	Gangpur State.	Mr. E. G. Barton	Oil, gold, iron and all other metals, ores, and minerals whatsoever (excepting coal.	P. L. .	About 200 square miles . .	1st December 1894.	2 years.*
18. Bengal .	Gangpur State.	Mr. E. G. Barton	Gold . .	M. L. .	About 200 square miles . .	1st February 1894.	30 years.
19. Bengal .	Kharsawan State, Chota Nagpur.	Kharsawan Gold Syndicate, Limited.	Gold, silver, copper and other metals.	M. L. .	All uncultivated and barren lands, *viz.*, waste lands, nullahs, rivers, and small hills, except cultivated lands in Ramgarh, Handi, Bhaja Putpur, and eleven other mouzas in Kharsawan.	1st July 1890.	20 years.
20. Bengal .	Bonai State	Bengal Gold, and Silver Company, Limited.	Gold, silver, lead, copper, iron, coal, etc.	P. L. .	All the waste lands in the State, excepting certain specified tracts.	...	3 years.
21. Bengal .	Bonai State	Bengal Gold and Silver Company, Limited.	Gold silver, lead, copper, iron, coal, etc.	M. L. .	A block not exceeding $2\frac{1}{4}$ square miles in one village of the State to be selected during the continuance of the term of the prospecting lease.	...	30 years.
22. Bengal .	Darjeeling.	Finlay, Muir & Co.	Coal and limestone.	P. L. .	4 square miles	...	1 year.

* During the continuance of this term, the lessee can apply for a mining lease or mining leases not exceeding three in number for working gold, and not exceeding five in number for working any other minerals or oils.

NOTE.—P. L. denotes Prospecting license. E. L. denotes Exploring license. M. L. denotes Mining lease.

Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of Grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
43. Bengal	Hazaribagh	Messrs. F. F. Christein & Co.	Mica	M. L.	7·1 acres	1st January 1890.	5 years.
44. Bengal	Hazaribagh	Jankinath Sen	Mica	M. L.	1·9 poles	1st August 1889.	5 years.
45. Bengal	Hazaribagh	Jankinath Sen	Mica	M. L.	5·73 acres	1st August 1889.	5 years.
46. Bengal	Hazaribagh	Jankinath Sen	Mica	M. L.	8·99 acres	1st August 1889.	5 years.
47. Bengal	Hazaribagh	Rajkrishna Sahana	Mica	M. L.	2·68 acres	21st January 1890.	5 years.
48. Bengal	Hazaribagh	Rajkrishna Sahana	Mica	M. L.	11·9 acres	2nd May 1891.	5 years.
49. Bengal	Hazaribagh	Ganpat Roy	Mica	M. L.	1·23 acres	15th November 1890.	5 years.
50. Bengal	Hazaribagh	Rasik Lal Halder	Mica	M. L.	1·05 acres	29th September 1891.	5 years.
51. Bengal	Hazaribagh	W. R. Macdonald	Mica	M. L.	5·73 acres	19th September 1891.	7 years.
52. Bengal	Hazaribagh	W. R. Macdonald	Mica	M. L.	7·61 acres	4th September 1891.	7 years.
53. Bengal	Hazaribagh	Nand Lal and Rasik Lal Halder.	Mica	M. L.	1·88 acres	16th September 1892.	5 years.
54. Bengal	Hazaribagh	Mr. W. D. Clyburn	Mica	M. L.	12·8 acres	25th July 1891.	5 years.
55. Bengal	Hazaribagh	Messrs. F. F. Christein & Co.	Mica	M. L.	29·9 acres	1st October 1891.	5 years.
56. Bengal	Hazaribagh	Messrs. F. F. Christein & Co.	Mica	M. L.	12 entire villages	1st September 1891.	5 years.
57. Bengal	Hazaribagh	Rajkrishna Sahana	Mica	M. L.	0·85 acres	15th January 1892.	15 years.
58. Bengal	Hazaribagh	Shew Nath Ram, transferred to C. A. Dickson, Esq.	Mica	M. L.	5·44 acres	1st January 1892.	5 years.
59. Bengal	Hazaribagh	W. D. Clyburn, Esq.	Mica	M. L.	1·37 acres	29th April 1892.	5 years.
60. Bengal	Hazaribagh	Messrs. F. F. Christein & Co.	Mica	M. L.	3 acres	4th January 1894.	5 years.
61. Bengal	Hazaribagh	Messrs. F. F. Christein & Co.	Mica	M. L.	2·31 acres	4th January 1894.	5 years.
62 Bengal	Hazaribagh	W. R. MacDonald, Esq.	Mica	M. L.	17·48 acres	19th December 1893.	5 years.
63. Bengal	Hazaribagh	W. R. MacDonald, Esq.	Mica	M. L.	1 acre	17th September 1894.	5 years.
64. Bengal	Hazaribagh	W. D. Clyburn, Esq.	Mica	M. L.	·76 acres	4th November 1893.	5 years.
65. N.-W. Provs.	Naini Tal	Lala Krishna Sha, Rai Bahadur.	Sapphires, crystals, rubies, and topaz.	P. L.	276·34 acres	1st January 1893.	1 year.
66. N.W. Provs.	Naini Tal	North-West Limestone Company. (Colonel Ross, Managing Director.)	Limestone	M. L.	About 73 square miles in the Kumaon Bhabar.	...	10 years.
67. Panjab	See column 6	Panjab Oil Syndicate. (Messrs. McLellan and R. A. and B. T. Townsend.)	Petroleum	P. L.	Throughout the Panjab, north and west of a line drawn from Jummu to Sialkot, thence following the line of Railway, *viâ* Wazirabad, Lala Musa, Pind Dadan Khan, and Khandian to Khowar and from the last-named place due west to the Western Frontier of the Panjab.	1st January 1891.	3 years.

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Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
68. Panjab	Delhi	Zemindars of Arangpur in the Ballabgarh Tahsil.	Crystals	M. L.	Village limit	19th August 1892.	17 years, *i.e.*, for current settlement.
69. Panjab	Kangra	Messrs. McDonald and Farquhar.	Minerals in general.	E. L.	Within the limits of the Waziri-Rupi Jagir.	*	1 year.
70. Central Provs.	Chanda (Cherla Taluq).	Godavari Coal Company. (Messrs. Binny & Co.)	Coal	M. L.	4⅓ square miles	...	20 years.
71. Central Provs.	Narsinghpur (Mohpani)	Nerbudda Coal and Iron Company.	Coal	P. L.	12 square miles	1st August 1893.	1 year.
72. Central Provs.	Narsinghpur (Mohpani)	Nerbudda Coal and Iron Company.	Coal	M. L.	6 square miles	...	...
73. Central Provs.	Jabalpur	Medan Koal	Limestone	M. L.	Not known	28th February 1894.	12th October 1894.
74. Central Provs.	Jabalpur	Mampher Koal	Limestone	M. L.	Not known	2nd March 1894.	12th October 1894.
75. Central Provs.	Jabalpur	Raghu Nath	Limestone	M. L.	Not known	24th March 1894.	12th October 1894.
76. Central Provs.	Jabalpur	Mr. Cooke	Limestone	M. L.	1·00	1st October 1894.	1896.
77. Central Provs.	Jabalpur	Mr. Cooke	Limestone	M. L.	·75	1st June 1894.	September 1898.
78. Central Provs.	Jabalpur	Sheo Narain Bajpai.	Limestone	M. L.	1·00	1st October 1894.	September 1897.
79. Central Provs.	Jabalpur	Sheo Narain Bajpai.	Limestone	M. L.	1·00	1st October 1894.	September 1897.
80. Central Provs.	Jabalpur	Ganesh Pershad	Limestone	M. L.	1·00	1st October 1894.	September 1896.
81. Central Provs.	Jabalpur	Manak Chand Sookhlal.	Limestone	M. L.	1·00	1st October 1894.	September 1897.
82. Central Provs.	Jabalpur	Chandidin	Limestone	M. L.	1·00	1st October 1894.	September 1899.
83. Central Provs.	Jabalpur	Chandidin	Limestone	M. L.	1·00	1st October 1894.	September 1895.
84. Central Provs.	Jabalpur	Babu Jadu Nath	Limestone	M. L.	1·00	1st October 1894.	September 1895.
85. Central Provs.	Jabalpur	Dr. Dyer	Limestone	M. L.	1·75	1st October 1894.	September 1895.
86. Central Provs.	Jabalpur	Mr. S. G. Cooke	Limestone	M. L.	2·00	1st October 1894.	December 1895.
87. Burma	Ruby Mines	Streeter & Co. (Ruby Mines Company.)	Rubies	M. L.	Local areas included in the townships of Mogak, Kyatpyin, and Katha in the Ruby Mines District.	1st November 1889.	7 years.
88. Burma	Shwebo	Burma Coal Company (Mr. F. Herrmann).	Coal	M. L.	3 square miles and 350 acres	1st November 1890.	20 years.
89. Burma	Upper Chindwin.	Burma Coal Syndicate.	Coal	M. L.	6·66 square miles in the Kale coalfield.	...	50 years.
90. Burma	Shwebo	Burma Coal Company.	Coal	P. L.	84 square miles in the Male township.	...	1 year.
91. Burma	Magwe	Burma Oil Company (Finlay, Fleming & Co.)	Petroleum	M. L.	1 square mile in Yenangyaung (Kodaung grant).	1st January 1890.	20 years.
92. Burma	Pakôkku	Burma Oil Company (Finlay, Fleming & Co.).	Petroleum	M. L.	66 State wells and the lands known as the Yenankyet State reserve as shown in the plan and schedule.	1st October 1891.	20 years.
93. Burma	Magwe	Burma Oil Company (Finlay, Fleming & Co.	Petroleum	M. L.	164 State wells and the several pieces of land adjacent thereto situate in the township of Yenangyaung.	1st October 1891.	20 years.

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Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of Grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
94. Burma	Magwe	Burma Oil Company (Finlay, Fleming & Co.).	Petroleum	M. L.	2·824 square miles in Yenangyaung	1st November 1892.	25 years.
95. Burma	Magwe	Messrs. Orr, Aria and Borries.	Petroleum	M. L.	1 square mile in Yenangyaung	...	...
96. Burma	Myingyan	Messrs Orr. Aria and Borries.	Petroleum	M. L.	1·06 square miles in Yenangyaung	...	
97. Burma	Myingyan	Deacon Syndicate	Petroleum	M. L.	3·72 square miles in Yenangyaung	...	25 years.
98. Burma	Minbu	Buckland Syndicate.	Petroleum	M. L.	1·55 square miles in Yenangyaung	...	
99. Burma	Minbu	Burma Oil Company.	Petroleum	M. L.	1 square mile	1st April 1893.	25 years.
100. Burma	Katha	Mr. C. M. P. Wright.	Minerals or mineral oil.	E. L.	Wuntho Sub-division	13th January 1893.	1 year.
101. Burma	Katha	Mr. S. Von Kottwitz.	Minerals or mineral oil.	E. L.	Pinlebu Sub-division	29th March 1893.	1 year.
102. Burma	Mergui	Captain Menzell	Tin and other minerals and mineral products.	P. L. and M. L.	Maliwun township	1st November 1892.	P.L. 5 years; then M. L, 21 years.
103. Burma	Bawzaing State in the Southern Shan States.	Saw Ho Shoke	Lead	M. L.	Area 4½ square miles	1st October 1892.	5 years.
104. Burma	Kyaukpyu	Naga Ni Ye	Petroleum	M. L.	1 acre	12th March 1894.	10 years.
105. Burma	Kyaukpyu	Wapa Sayapu	Petroleum	M. L.	0·90 of an acre	9th May 1894.	10 years.
106. Burma	Kyaukpyu	Maung Pan Hla	Petroleum	M. L.	27·23 acres	12th June 1894.	30 years.
107. Burma	Kyaukpyu	Maung Tun Hla	Petroleum	M. L.	5·24 acres	12th June 1894.	30 years.
108. Burma	Kyaukpyu	Ma Ko	Petroleum	M. L.	0·73 acres	15th June 1894.	30 years.
109. Burma	Kyaukpyu	Maung Yan Aung, Ma E Bon, Ma Shwe Bon, Ma Mya Nagon	Petroleum	M. L.	4·98 acres	29th September 1894.	30 years.
110. Burma	Kyaukpyu	Arakan Petroleum Company, Limited.	Petroleum	M. L.	25·53 acres	18th October 1894.	30 years.
111. Burma	Kyaukpyu	Mr. R. S. Dunlop	Petroleum	M. L.	18·80 acres	18th October 1894.	30 years.
112. Burma	Kyaukpyu	Ma Mya	Petroleum	M. L.	2·23 acres	3rd November 1894.	30 years.
113. Burma	Kyaukpyu	Nga Kyaung She	Petroleum	M. L.	0·50 acres	10th December 1894.	10 years.
114. Burma	Tavoy	Mr. J. D. Watson	Gold	P. L.	400 acres in the Central township	2nd January 1894.	1 year.
115. Burma	Tavoy	Mr. J. D. Watson	Gold	P. L.	178 acres 9 annas in the Central township.	2nd January 1894.	1 year.
116. Burma	Katha	Mr. C.M.P.Wright	Gold	P. L.	1 square mile at Mandaw, Kawlin Sub-division.	4th April 1894.	1 year.
117. Burma	Katha	Mr. C.M.P.Wright	Gold	P. L.	1 square mile within the Mawnaing township, Kawlin Sub-division.	6th April 1894.	1 year.
118. Burma	Katha	Mr. C. Vetter	Gold	M. L.	1 mile by ¼ mile, Mawnaing circle, Mawnaing township.	1st August 1894.	30 years.

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Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of Grant.	Area.	Date of commencement.	Term.
1	3	3	4	5	6	7	8
119. Burma	Katha	Mr. H. Ascher	Gold	M. L.	1 mile by ¼ mile, Leiksaw circle	1st August 1894.	30 years.
120. Burma	Katha	Mr. Fritz Eggena	Gold	M. L.	1 mile by ¼ mile, Mawnaing circle, Mawnaing township.	1st August 1894.	30 years.
121. Burma	Katha	Messrs. Hegt & Co., Rangoon.	Gold	P. L.	1 square mile, Banmauk township	1st October 1894.	1 year.
122. Burma	Katha	Messrs. Hegt & Co., Rangoon.	Gold	P. L.	1 square mile, Mawnaing township	1st October 1894.	1 year.
123. Burma	Thayetmyo	Messrs. Lewis and Hulberts.	Coal	M. L.	960 acres approximately	2nd November 1894.	Not known.
124. Burma	Pakôkku	Burma Oil Company.	Petroleum	P. L.	3 square miles	May 1894	1 year.
125. Burma	Magwe	Burma Oil Company.	Petroleum	M. L.	3 square miles	1st August 1894.	25 years.
126. Burma	Mandalay	Mr. F. C. Kennedy, C.I.E., Manager, Irrawaddy Flotilla Company, Limited.	Precious stones other than rubies.	P. L.	1 square mile	10th August 1894.	1 year.
127. Assam	Lakhimpur	Messrs. J. Alston and W. E. Goodfellow.	Gold	E. L.	Tippam Hills	29th August 1892.	1 year.
128. Assam	Lakhimpur	Mr. W. E. S. Jefferson.	Gold and precious stones.	P. L.	Within 100 feet of the banks of the rivers of North Lakhimpur.	23rd May 1892.	1 year.
129. Assam	Sibsagar	Mr. T. H. Trottman.	Gold and precious stones.	P. L.	Within 100 feet of the banks of certain rivers in the district of Sibsagar.	1st April 1893.	1 year.
130. Assam	Khasi and Jaintia Hills.	Mr. Oswin Weynton.	Petroleum	M. L.	4 square miles	...	20 years.
131. Assam	Lakhimpur	Assam Railways and Trading Company.	Petroleum	M. L.	4 square miles	1st January 1892.	25 years.
132. Assam	Lakhimpur	Assam Oil Syndicate.					
133. Assam	Naga Hills.	Assam Tea Company.	Coal	M. L.	Naga Hills as shown in the schedule attached to the lease.	28th February 1891.	10 years.
134. Assam	Khasi and Jaintia Hills.	Messrs. Kilburn & Co.	Coal	E. L.	Langrin coal-field, as shown in schedule attached to the license.	4th July 1892.	2 years.
135. Assam	Khasi and Jaintia Hills.	Messrs. Kilburn & Co.	Coal	P. L.	6 square miles in the Langrin coal-field.	(*b*)	1 year.
136. Assam	Sylhet	Mr. H. A. Brown-Constable.	Coal	P. L.	2 1/16th square miles in the Patharia Hills.	5th October 1893.	1 year.
137. Assam	Lakhimpur	Messrs. A. W. Madden and C. F. Strangways.	Gold and precious stones.	P. L.	Within 100 feet of the banks of the rivers of North Lakhimpur.	1st November 1893.	1 year.
138. Assam	Khasi and Jaintia Hills.	Mr. R. R. Waller, 5 Lyon's Range, Calcutta.	Coal	M. L.	345 acres in the Lakadong Delloiship, Jaintia Hills.	1st July 1894.	30 years.
139. Assam	Lakhimpur	Messrs. A. W. Madden and C. F. Strangways.	Gold and precious stones.	E. L.	Within 100 feet of the bank of the river Dehing, Noa-Dehing, and Buri-Dehing, all their tributaries, chiefly the Tingrai, Tipling, Thangrang, Digboi, Pawai, Jangiri, Namrúp, Tirap, Namdnág, Makum pani, and Namsáng.	5th July 1894.	1 year.
140. Assam	Lakhimpur	Messrs. A. W. Madden and C. F. Strangways.	Gold and precious stones.	P. L.	Ditto ditto ditto	12th July 1894.	1 year.
141. Rajputana	Ulwar State	Rajwade Glass Manufacturing Company, Limited.	Lime stone, quartz, flint, and crystals.	M. L.	Certain local areas noted in the schedule attached to the lease.	1st January 1892.	25 years.

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Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of Grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
142. Madras .	Bhadrachalam Taluq, Godavari.	The Godavari Coal Company, Limited.	Coal . .	Prospecting license.	10½ square miles . . .	1st April 1895.	1 year.
143. Madras .	Salem District, Tirupatur Taluq.	Messrs. Arbuthnot & Co., Madras.	Coal . .	P. L. .	148·95 acres of unoccupied Government waste land scattered in small patches in 6 villages.	22nd February 1895.	1 year.
144. Madras .	Salem District, Tirupatur Taluq.	Mr. Charles Kohl of Madras.	Coal and mineral oils.	P. L. .	52·76 acres of unoccupied Government waste land in the village of Kalandira.	22nd February 1895.	1 year.
145. Madras .	Salem District, Tirupatur Taluq.	Mr. Albert Gerdes of Madras.	Coal . .	P. L. .	32·51 acres of unoccupied Government waste land in the village of Aturkuppam.	22nd February 1895.	1 year.
146. Madras .	Coimbatore, Kollegal Taluk.	Mr. Bakewell .	Gold . .	Do. .	1 square mile of forest land to the North-West Cowdalli.	9th December 1895.	1 year.
147. Madras .	Nellore .	K. Muniswamiaiah	Mica . .	Mining lease.	10 acres	9th December 1895.	2 years.
148. Madras .	Nellore .	Hadi Badsha Saheb & Co.	Mica . .	Prospecting license.	6 acres	9th December 1895.	6 months.
149. Madras .	Nellore .	Hadi Badsha Saheb & Co.	Mica . .	Do. .	10 acres	9th December 1895.	6 months.
150. Madras .	Trichinopoly	Messrs. Leighton & Co.	Mica . .	Mining lease.	23·50 acres	9th December 1895.	1 year.
151. Madras .	Nellore .	Hadi Badsha Saheb & Co.	Mica . .	Prospecting license.	36·41 acres	9th December 1895.	2 years.
152. Madras .	Nellore .	Hadi Badsha Saheb & Co.	Mica . .	Mining lease.	0·50 acres	9th December 1895.	2 years.
153. Madras .	Nellore .	K. Venkiah .	Mica . .	Do. .	0·50 acres	9th December 1895.	2 years.
154. Madras .	Nellore .	Ismail Sait & Co. .	Mica . .	Do. .	1·0 acres	9th December 1895.	1 year.
155. Madras .	Nellore .	Hadi Badsha Saheb & Co.	Mica . .	Do. .	2·0 acres	9th December 1895.	2 years.
156. Madras .	Nellore .	Hadi Badsha Saheb & Co.	Mica . .	Prospecting license.	15·0 acres	9th December 1895.	6 months.
157. Madras .	Nellore .	K. Venkiah .	Mica . .	Do. .	16·80 acres	9th December 1895.	6 months.
158. Madras .	Nellore .	K. Venkiah .	Mica . .	Mining lease.	3·75 acres	9th December 1895.	2 years.
159. Madras .	Nellore .	Kuddus Badsha Saheb & Co.	Mica . .	Prospecting license.	Not available	9th December 1895.	6 months.
160. Madras .	Nellore .	S. Ismail Sait & Co.	Mica . .	Do. .	4·0 acres	9th December 1895.	6 months.
161. Madras .	Nellore .	S. Ismail Sait & Co.	Mica . .	Mining lease.	1·0 acres	9th December 1895.	2 years.
162. Madras .	Nellore .	K. Meniswami Iyer.	Mica . .	Prospecting license.	4·43 acres	9th December 1895.	6 months.
163. Madras .	Nellore .	Kyruddeen Saheb	Mica . .	Do. .	10·0 acres	9th December 1895.	6 months.
164. Madras .	Nellore .	Kyruddeen Saheb	Mica . .	Mining lease.	1·0 acres	9th December 1895.	2 years.
165. Madras .	Nellore .	Mr. E. H. Sargent	Mica . .	Prospecting license.	40·0 acres	9th December 1895.	6 months.

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Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive—continued.

Province.	District.	Grantee.	Minerals.	Nature of Grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
166. Madras .	Nellore .	Mr. E. H. Sargent	Mica . .	Mining lease.	4·0 acres	9th December 1895.	2 years.
167. Madras .	Nellore .	Badsha Saheb & Co.	Mica . .	Prospecting license.	24·0 acres	9th December 1895.	6 months.
168. Madras .	Nellore .	C. Sreenivasulu Chetti.	Mica . .	Mining lease.	1·0 acres	9th December 1895.	2 years.
169. Madras .	Nellore .	Badsha Saheb & Co.	Mica . .	Do. .	3·0 acres	9th December 1895.	2 years.
170. Madras .	Nellore .	Mr. J. B. Allen .	Mica . .	Do. .	1·68 acres	9th December 1895.	2 years.
171. Madras .	Nellore .	K. Munisamiaiah	Mica . .	Prospecting license.	4·0 acres	9th December 1895.	6 months.
172. Madras .	Nellore .	Badsha Saheb & Co.	Mica . .	Mining lease.	4·0 acres	9th December 1895.	2 years.
173. Madras .	Nellore .	S. Ismail Sait & Co.	Mica . .	Do. .	8·55 acres	9th December 1895.	2 years and 6 months.
174. Madras .	Nellore .	K. Venkiah .	Mica . .	Do. .	5·35 acres	9th December 1895.	2 years.
175. Madras .	Nellore .	Messrs. Best & Co.	Mica . .	Do. .	2·0 acres	9th December 1895.	2 years.
176. Bombay .	Bijapur .	Mr. J. H. Nelson, a retired member of the Madras Civil Service.	Gold, diamond and other precious stones.	Prospecting license.	7,029 feet in length, 5,629 feet in breadth.	1st October 1894.	2 years.
177. Bombay .	Dharwar .	Haji Ismail Haji Mahomed Kulli Mirza Bagdadi, residing at Ahiawar in the Dharwar District.	Gold . .	Do. .	Gunthas, 27, *i.e.*, nearly $\frac{3}{4}$ of an acre.	1st January 1895.	1 year.
178. Bengal .	Kolhan Estate, Singhbhum.	Mr. D. Kirkman .	Gold and silver and other minerals.	Exploring license.	About 3 square miles . .	1st December 1895.	1 year.
179. Bengal .	Porahat Estate, Singhbhum.	Messrs. Jardine, Skinner & Co.	Gold, ironstone or limestone.	Mining lease.	8 miles long by $\frac{1}{8}$th mile or 660 feet broad or 1 square mile.	21st day of September 1895.	30 years.
180. Bengal .	...	Mr. W. Noble .	Mica . .	Do. .	·94 acre	18th May 1895.	$2\frac{1}{2}$ years.
181. Bengal .	...	Mr. W. R. Macdonald.	Mica . .	Do. .	·53 acre	18th February 1895.	5 years.
182. Bengal .	...	Mr. J. Hampton .	Mica .	Mining lease.	·99 acre	12th February 1895.	5 years.
183. Bengal .	...	Mr. W. D. Clyburn.	Mica .	Do. .	1·03 acre	21st February 1895.	5 years.
184. Bengal .	...	Mr. W. D. Clyburn.	Mica .	Do. .	1·03 acre	21st February 1895.	5 years.
185. Bengal .	...	Mr. W. Noble .	Mica .	Do. .	1·03 acre	11th March 1895.	5 years.
186. Bengal .	...	Mr. W. R. Macdonald.	Mica .	Do. .	$\frac{3}{4}$ acre	11th May 1895.	5 years.
187. Burma .	Katha .	Mr. M. L. N. Hegt	Gold .	Prospecting license.	640 acres near Kyaupyôk village	1st February 1895.	1 year.
188. Burma .	Katha .	Messrs. Hegt & Co.	Gold .	Do.	640 acres or 1 square mile near Pinhwè village.	1st February 1895.	1 year.
189. Burma .	Katha .	Mr. W. Miller .	Gold .	Do. .	$\frac{1}{4}$ of a square mile . . .	1st August 1895.	1 year.
190 Burma .	Katha .	Mr. C. M. P. Wright.	Gold .	Mining lease.	$\frac{1}{4}$ of a square mile, Mownaing circle, Kawlin Sub-division.	1st April 1895.	30 years.

NOTE.- P. L. denotes Prospecting license. E. L. denotes Exploring license. M. L. denotes Mining lease.

Statement of Mineral Grants and Licenses made from the year 1889 to 1895 inclusive—concluded.

Province.	District.	Grantee.	Minerals.	Nature of grant.	Area.	Date of commencement.	Term.
1	2	3	4	5	6	7	8
191. Burma .	Katha .	Mr. H. Ascher .	Gold .	Mining lease.	¼ of a square mile, Manlôn circle, Banmauk township.	1st March 1895.	30 years
192. Burma .	Ruby Mines	Mr. W. D'Attaides	Mica .	Do. .	320 acres, Twinnge township .	1st August 1895.	20 years
193. Burma .	Thayetmyo	Mr. R. Lewis .	Coal .	Prospecting license.	1,547·70 acres	7th August 1895.	1 year.
194. Burma .	Akyab .	Mr. W. Savage .	Petroleum .	Mining lease	8·46 acres	15th February 1895.	25 years.
195. Burma .	Tavoy .	Mr. J. D. Watson	Gold . .	Prospecting license.	400 acres in Central township .	2nd January 1895.	1 year.
196. Burma .	Tavoy .	Mr. J. D. Watson	Gold . .	Do. .	178·9 acres in Central township .	2nd January 1895.	1 year.
197. Assam .	Khasi and Jaintia Hills.	Messrs. Kilburn & Co., Calcutta.	Coal . .	Do. .	6 square miles in the Langrim coal field.	1st November 1895.	1 year.
198. Assam .	Lakhimpur	Messrs. A. W. Madden and C. F. Strangways.	Gold and precious stones.	Do. .	Within 100 feet of the banks of the rivers of North Lakhimpur Sub-division.	1st November 1895.	1 year.
199. Assam .	Lakhimpur	Messrs. A. W. Madden and C. F. Strangways.	Gold and precious stones.	Do. .	Within 100 feet of the banks of the Dehing, Naya-Dehing and Buri-Dehing, etc.	12th July 1895.	1 year.
200. Assam .	Naga Hills	Mr. J. S. Hulbert, Superintendent, Assam Tea Company.	Coal . .	Do. .	4 square miles in the Mokokchang Sub-division.	1st January 1895.	1 year.
201. Assam .	Khasi and Jaintia Hills.	Looba Tea Company, Limited, Sylhet.	Coal . .	Mining lease.	844 acres in the Luba Valley in the Jaintia Hills.	1st January 1895.	30 years.

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